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LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

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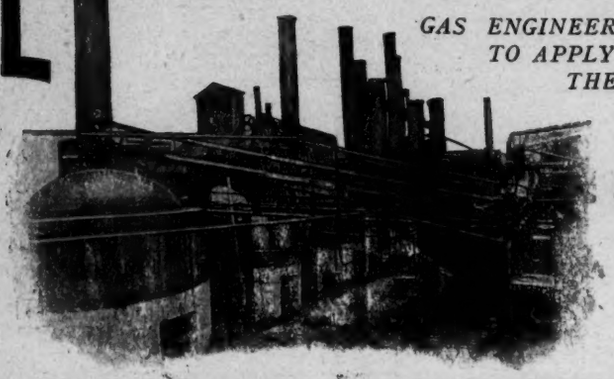

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CONTENTS.

EDITORIAL NOTES.

Sympathy with the President 23
What of the New Year? 23
Coke Competition Papers 24
Gas and Electricity in the Domestic Life of Glasgow 24
Tar Peak Prices and Bitumen Competition . 25
A Large Opportunity—British Road Tar Association—Neglected Gas Appliances—Nitrate Producers and Synthetic Nitrogen—Coal Subvention Expenditure 25
A Valuable Coal-Field—Pensions and Income-Tax 26

Personal 26
Obituary 26
Forthcoming Engagements 26
Electricity Supply Memoranda 27
Atmospheric Pollution 28
"The Decaying Industry"—An Instructive Graph for Electrical Enthusiasts . . . 29
The Film in Industrial Work. By J. W. C. . 29
Measurement of Coal. By J. E. Lea, B.Sc., M.I.Mech.E. 30
Coke Competition Papers (£10 Awards)—
The Manufacture of Coke of the Most Suitable Qualities for Domestic and Industrial Purposes. By "Eliya" 31
Coke Production. By "Jovax" 31
Production of a Good Coke. By "Reformare" 33
Glover-West Verticals at Pizen—Guarantees and Working Results 34
Development at Aldershot—New Three Million C.Ft. Holder to be Erected 35
Gas Acts for 1925 36
American Gas Association—Reports and Papers Reviewed 37
The People's Gas Light and Coke Company—Seventy-Five Years of Gas in Chicago . . 38
Gas Escape at New Bridge Street, Blackfriars—Sunday, Nov. 15 39
Institution of Gas Engineers' Education Scheme—Conference with Teachers . . 40

CORRESPONDENCE.

Suction Regulator for Turbo-Exhausters . . 41
Institution of Gas Engineers Education Scheme 41

REGISTER OF PATENTS.

Water and Gas Supply Valves of Water Heaters—Ewart, J. H. 41
Coking of Coal—Rushen, P. C. 41
Lids for Retort Mouthpieces—Burton, A. E. 41
Distillation of Carbonaceous Materials—Laing, B., and Nielsen, H. 41
Taps or Valves—Yates, H. J., Howlett, M., & Co., Ltd., and Dolphin, J. 42
Grids for Purifiers—Spencer, S. E. . . . 42
Domestic Wash-Boilers—Mitchell, G. P. . . 42
Cookers—Main, R. & A., Ltd., and Aird, K. . 42

MISCELLANEOUS NEWS.

Birmingham Coke Sales 43
Gas—The Universal Flame 43
Ceará Gas Company, Ltd. 43
Gas Regulation Act Applications 44
In Harness at 95—Presentation to Old Employees 44
Diaries and Calendars 44
North-East Coast Coal Trade 44
Yorkshire and Lancashire Coal Trade . . 44
Coal Trade in the Midlands 44
Current Sales of Gas Products 45
Stock Market Report 46

PARAGRAPHS.

Leeds University Lectures—"The Real Micawber" 29
Thirty Useful Equivalent Tables 38
"F.E." Dryers for Coal and Coke—"Flame Doors" for Furnaces—Paint for Chemical Works—National Lime Association . . . 40
Record Output at Manchester 43
Progress at Hinckley—Provincial Incandescent Fittings Co., Ltd. 44
Holophane, Ltd.—Progress at Accrington—Fatal Acetylene Explosion—Gas Cooking Triumphs—Relief of Rates at Oswaldtwistle—New Joint-Stock Companies—Price of Gas at Hartlepool—Housing Developments at Birmingham 45

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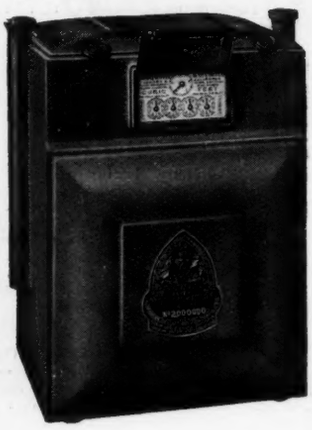

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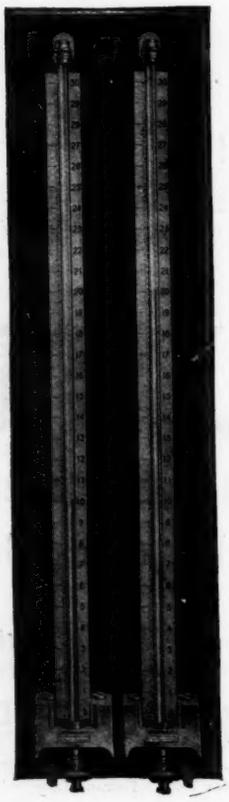

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VOL. CLXXIII., No. 3269.] WEDNESDAY, JANUARY 6, 1926. [78TH YEAR.

EDITORIAL NOTES.

Sympathy with the President.

IT is with the deepest sorrow that we have to make reference to the bereavement of the President of the Institution of Gas Engineers, Mr. C. F. Botley, M.Inst.C.E. After a long illness, most patiently borne, his wife passed away (at the age of 54 years) at their home, the "Guildables," Hastings, on Monday of this week. The sympathy of the whole gas profession will go out to our friend at Hastings. Such a blow at any time is an appalling one in such a happy family as that of our President, but the mournful event falling in the year when the highest honour has been conferred upon him by his professional compeers, accentuates it. The funeral is to take place on Friday, when the service will be at Holy Trinity Church, Hastings, at 2 o'clock.

What of the New Year?

WE finished the old year with retrospect; we begin the new one by looking forward, and exploring the probabilities. However carefully the examination is made, it is supremely difficult to say what is probable; but it would be easy enough to give quite a respectable list of possibilities. One thing that is very probable is that the gas business will during the year continue to have the same luxuriant growth that has been witnessed particularly in the past two or three years, and this despite the higher price of gas in not a few areas than a year or so ago. The growth is due to the good standard of propagation effort in the industry, and to the excellent efficiency of modern gas appliances; the higher price (against which we all rebel) is due to the—temporary, we hope—unfriendly attitude of secondary products towards the best economic trading conditions. But in other imposing respects, we contemplate matters without being able to make any definite or reliable forecast. Indeed, the position for gas administrators and advisory officials is obscure; and it will be very difficult for them to shape policy. Certain it is that the utmost circumspection will be needed. No one can say what is probable in respect of coal, labour, and secondary products. What we do know is that in regard to them all, there is a good deal of possibility, which may be good or ill.

The coal truce comes to an end in April. Long before then, the report of the Coal Commission will have been issued, and we shall know whether or not it contains acceptable plans for improving the conditions of the coal industry and promoting a real working *liaison* between the owners and the men which will make us secure against the uncertainties and interruptions which have done so much to affect adversely national and industrial interests. We should have greater hope of success if the miners were not dominated by Communist extremists, whose greatest instrument is unrest, for fomenting which no opportunity, no slender pretext, is allowed to escape. They will accept nothing which will not serve their ends. Hence it is that the, relatively speaking, moderate elements in the Executive of the Miners' Federation will have actively to exercise their whole influence with the miners if they hope the present inquiry is going to achieve some good purpose. But they, too, have got to wait for the report, to see whether its recommendations are such that they can support them. Some myopic people would like the country to go on indefinitely paying a subvention to the coal industry; but the country cannot afford to continue to pay for the upkeep of the results of the policy of the Miners' Federation. There must be an end to it; and then which is it to be—Peace or Strife? No one can yet tell, which means that all industries must be prepared for the worst. That is the course of wisdom, and the penalty of uncertainty. There are only four months within which to prepare and organize. So far as the gas and electricity industries are concerned, the season of heaviest demand upon them will have ceased; and it is hoped that we shall be entering upon the enjoyment of genial spring weather. But such public utility industries cannot afford to run any risks by waiting to ascertain the issues of the inquiry. Therefore, stocks will require to be generously considered, expensive though they may be.

The next matter which is under discussion is the claim of the Union representatives for higher wages and other considerations for gas workers. As the matter is before the Industrial Council, it is not open to general comment, nor can we talk of the probabilities. But it may be hoped that the Union representatives will take into account the altered state of the industry in respect of secondary products, the excellent and constant conditions of employment of the men, the severe and growing competition to which the industry is subject, and the necessity for maintaining—in the interests of the men themselves and the expansion of employment—the industry in as strong a position as possible. Strength is not to be gained by further increasing the price of gas. There is an economic point beyond which it is dangerous to go.

Meanwhile, the outlook for secondary products does not improve. It is true there are signs of a little better demand for coke from abroad; but this is only being obtained by a severe reduction in price. The average value obtained in November was only 19s. 2·8d. per ton, as compared with £1 14s. 3d. in November, 1924, and £1 14s. 10·4d. in November, 1923. There is painful knowledge, too, of coke accumulations at home, and of much lower prices than were at one time realizable. Today it is a question of how best to make our coke more efficient and acceptable for domestic grates. The question is not such a small one as cutting and grading—those are only incidental to the process of betterment. The lines of betterment comprise quality and structure; and improvements in these respects are related to more efficient conditions within the retorts. Policy demands that these matters shall not be allowed to rest, but that they shall be actively and critically investigated. We cannot obscure facts, or make them bend to fit our conditions. Our business is to try so to order our technical procedure that it will comply with the facts of requirement. That is the way—the only way—to make the demand for our solid smokeless fuel outstrip the supply. We wonder whether the year will be productive of good movement in this respect. We hope it will. In this connection many people have set their eyes hopefully upon the gas industry; and not a few trust it will in the main continue a negligent policy in regard to coke, while themselves working to produce a superior smokeless fuel. It does not do to be deterred from advancing along the road of improvement by listening to those who say: "You are in the position to do very well now with coke by the simple process of grading." If that is so in all cases and circumstances, why are we not doing better with this commodity in these fuel-using winter days?

It is a big question which is not to be dismissed by a few words based upon a remarkably restricted outlook.

Then there is the position of tar. The work of last year in connection with the rivalry between home-made tar and imported bitumen for road work has to be continued this year. There is, too, the competition of synthetic nitrogen and other fertilizers. This is a matter which is in good hands, and is being closely watched and actively followed up. There again future quantitative developments are somewhat obscure; and keener competition for the overseas trade is bound to come.

However, we are fortunate in the good response our primary business is making to unremitting propaganda. The industry has in its time had to face many critical situations, and has shown such vitality that, in the process of meeting adversity, it has come out better than it was when assailed. We believe it will be so in time in connection with the secondary products, in relation to which, as well as the primary product, no opening for economy and improved efficiency must be left unheeded, any more than must be the application of every feasible method for accelerating the utilization of gas—even to the adoption of a new system of charging for it, if it is likely to be efficacious.

Coke Competition Papers.

IN this issue we commence the publication of the papers, or portions of them, which gained the £10 awards in the Coke Competition. The contributions which secured the larger awards in the three sections were published in our special number on Nov. 9, which has been completely exhausted by a world-wide demand. There is one thing we particularly wish to impress regarding the material which is now being published in our columns. It is that readers must not look upon it as necessarily being, in any case, the complete contribution of the writer. It will be safer to regard what is being printed as an indication of the lines taken, as—apart from such considerations as limitations of space and of the time of our readers and expense—no good purpose would be served by going extensively over ground covered by the contributions already published. Readers will please bear this in mind, as our only object now is to extend the borders of interest and suggestion beyond the mass of material which we presented in the special number; and this means that considerable excision has to be made.

Gas and Electricity in the Domestic Life of Glasgow.

A PROLIFIC writer of papers on the subject of domestic electrification is Mr. R. Hardie, of the Glasgow Corporation Electricity Department. So frequently does he exercise his pen that apparently he has difficulty to find new diction for the same facts. His main theme is the wonderful accomplishments of electricity in the domestic life of Glasgow—particularly for electric cooking and heating. The figures he gives as to progress include, we believe, the result of the autocratic procedure which deprives a few hundred dwellers in Corporation houses of their liberty to decide for themselves the heating and cooking agent they shall employ. Through Mr. Hardie's repeated proclamations, Glasgow is held up as a brilliant example of what an energetic, enterprising, and (for the purpose) heavy capital-expending undertaking can do in developing the domestic electricity load, and so (in electrical imagination outside Glasgow) in causing the gas undertaking to start on the road of atrophy. The other side of the picture is not displayed by Mr. Hardie. A chart and some notes which we publish on a later page will amend his neglect in this regard, and will probably be enlightening to those many electrical men who have cultivated the apostatical habit of perusing the "JOURNAL" to ascertain the true facts regarding the gas industry, and which prevents them falling into the error of assuming that the gas industry is declining.

It will be remembered that recently attention was called to the fact that the output of the Gas Light and Coke Company in the seven days ended Dec. 6 showed an *increase* of 250 million c.ft. (1,250,000 therms), or 28 p.ct., over the corresponding period of the previous year. The graph referring to Glasgow shows the influence of outside temperatures on gas sales in that city, and incidentally conditions in sudden demands which would give ugly shocks to electricity undertakings if called upon to deal with such vagaries, for which they are totally unfitted. The chart contains several features. Let us take two or three of them. On Nov. 7 the output of gas was 33 million c.ft. odd, while on Nov. 19 it was about 42 million c.ft. in the twenty-four hours—a difference between the two days of 9 million c.ft. The calorific value of Glasow gas as supplied (according to our latest returns) is 477 B.Th.U. per cubic foot; so the difference of 9 million c.ft. is equal to 4,293,000,000 B.Th.U., and to the calorific value of 1,258,206 KW.-H. Just compare this *increase* in gas consumption, and what it thermally represents in KW.-H., with the following statement in the report of the Glasgow Corporation Electricity Department for the year ended May 31 last: "The maximum load or demand made upon "the power stations during the winter occurred on Dec. 22 "last, when the demand was 85,700 KW., as compared "with a maximum demand of 81,700 KW. last year—an "increase of 4000 KW., or 4·89 p.ct." Thus the maximum load in a day in the winter of 1924 upon the electricity stations of Glasgow fell very much short of the difference in gas consumption between the two November days to which we have been referring. What effect would provision to meet such flights in the demand for heat have upon the economic position of the electricity undertaking?

Another interesting point is that the 42 million c.ft. supplied on Nov. 19 is equal to the calorific value of 5,871,629 KW.-H. Even that high twenty-four hour output of 42 million c.ft. was exceeded on Christmas Day by 1 million c.ft. That is interesting, because the bulk of this record day's consumption cannot have been due to any other requirements than domestic; and the calorific value of this output being 20,511,000,000 B.Th.U., it was equal to the calorific value of 6,040,738 KW.-H. Again, the consumption on Christmas Day was 7 million c.ft. more than on the same day in 1924; and this is a remarkable testimony to the popularity of gas for domestic cooking and heating. Further, in Christmas week, 33½ million c.ft. more were drawn from the mains than during the Christmas week of 1924. These imposing statistical facts supply complete evidence that the people of Glasgow have not gone off their heads over domestic electrification; and that the big drum beater of the Electricity Department has been rather misleading people—of course, quite unconsciously and therefore unintentionally—by omitting to mention the true facts as to relative popularity and ability to meet the needs. Now that his attention is called to the matter, it would be interesting if Mr. Hardie would give us the explanation of this luxuriant demand for gas for domestic cooking and heating, in view of the claims he has made on behalf of electricity and the marvellous performances of the Electricity Department. They look rather insignificant in contrast with the facts relating to the Gas Department. While he is telling us this, it would also be instructive to learn from him whether he considers it would be to the advantage of the Electricity Department to have to meet similar enormous flights in consumption for heating purposes—during some hours of the day, and during falls of temperature in winter—through intermittent cooking loads and domestic heating requirements.

There is another point upon which Mr. Hardie may wish to enlighten us. It is this, Why is it there is no abatement of, but a continued increase in, the applications for gas appliances—appliances which, in his opinion, are moving rapidly to the scrap-heap? If his capacity for absorbing figures and assigning to them their true meaning has not been exhausted by what has already been said, we should like him to explain a further fact. During the past seven months, the degree of the reputed enthusiasm of Glasgow people for electric appliances has been illustrated by the Glasgow Corporation Gas Department fixing no less than 27,000 extra appliances in houses, workshops, offices, churches, &c. We should like that 27,000 seven-months' increase to be well marked, because it is interesting to contrast it with the *total* of the domestic electric appliances fixed by the Electricity Department up to the end of the financial year last May. In the annual report of the Department, these passages appear: "There is a noticeable "increase in the number and variety of appliances installed "for the consumption of electricity other than lighting

"in domestic and business premises. In domestic pre-"mises, there are over 32,000 appliances (heaters, irons, "cookers, cleaners, &c.), equivalent to a demand of "37,650 KW., and in business premises over 12,900 pieces "of apparatus, equivalent to a demand of 18,860 KW., or "a total of over 44,900 appliances with a demand of 56,510 "KW. Of the above appliances, 6991 are hired-out by the "Department." The 32,000 domestic electric appliances are not much more than the seven months' increase in gas appliances! We suggest to Mr. Hardie that it is gas and not electricity which continues to win in the race for new custom and popularity. Electrical men and their Press will be very curious to learn from Mr. Hardie (after all he has told them) the reason why electricity has not done more in Glasgow to stem the rolling wave of increased gas application.

With the data advanced in this article before us, we heartily congratulate Mr. J. W. McLusky and his staff on the effective results of their work, which must be a little disconcerting to Mr. Hardie and those who have been making so much noise as to Glasgow's electrical successes, and, through that noise, spreading the idea among diminutive intellects that the use of gas for domestic purposes in Glasgow is rapidly tumbling downhill. The facts are too bulky to be hidden behind a screen of words. To attempt that sort of thing is ludicrous.

Tar Peak Prices and Bitumen Competition.

No apology is needed for reverting to this question, of which emphatic point was made by Sir Henry Maybury at the Public Works, Roads, and Transport Congress towards the end of November [see "JOURNAL" for Dec. 2, p. 576]. In the absence of any disclaimer, we are entitled to assume—as a matter of fact we know it to be true—that Sir Henry was in error in attributing to tar interests any deputation for the purpose he described.

It is further true that the only deputation by the tar interests (as representing their Trade Association) which had the honour of being received by Sir Henry waited on him in regard to the question of the quality of tar. When the present Road Board Specifications were in draft, their contents came to the knowledge of the Association of Tar Distillers, who—considering them still more lax than those then in operation, and being strongly of opinion that the competition of bitumen was being greatly strengthened by the poor quality of tar which was being somewhat largely put on the roads (albeit it complied fully with the specifications provided)—themselves appointed one of the most experienced of their number to draw up such a specification as would ensure a really good quality. This was done, and a new specification was agreed, and submitted to Sir Henry with the request for an interview. A deputation met Sir Henry, who, we undestand, declined to accept their suggestions on the ground that a good quality meant a higher price. Mr. Elford, therefore, to whose wise suggestion we referred in our editorial of Dec. 2, will know now that it is not to the tar interests he must go, but to the Ministry of Transport itself, if he would see good qualities of tar provided suitable for the various uses of the road authorities.

We have had some inquiry made into Sir Henry Maybury's further allegation as to the prohibitive prices of tar in the earlier years of this decade, and find (as we thought) that some distillers—incidentally they were working on co-operative schemes, and had the advantage of long-sighted co-operators in the tar producers—refused to raise the price of road tar beyond an economic figure. No doubt Sir Henry has forgotten this; but he should not—really he should not—so far misrepresent the facts as to say that the tar interests objected to the large use of tar on roads, when the truth is that the briquette interests deputised him with the view of leaving tar out of his buying-list, so that they could obtain pitch cheaply.

If Sir Henry Maybury would translate his sympathy for tar into action in its favour instead of giving rein to his evident fear of being accused of not being off with the old love before concerning himself with the new, he might do a very great service to an important British industry, to the motoring public (who do not want skiddy roads), and, by the avoidance of the import of a large quantity of unnecessary material, to the finances of the nation.

A Large Opportunity.

There should be a big opportunity for certain gas suppliers in the extensive housing scheme which the London County Council have in hand in the South-West of London. Application is being made to the Ministry of Health, under the Housing Act of 1925, for the confirmation of an Order for the compulsory purchase of lands situated in the urban districts of Sutton, Merton and Morden, Carshalton, and Mitcham. The estate will extend to 870 acres, and, on the part to be devoted to dwellings, it is estimated that ten will be built to the acre—the approximate total being 8000 houses, equal to the accommodation of about 35,000 people.

British Road Tar Association.

The British Road Tar Association should be as complete as possible in its representation and functions. In these competitive times we believe in such *ad hoc* bodies for looking after, promoting, and defending the interests of a commodity. There is plenty of work for the Road Tar Association to do. The Central Executive Board of the National Gas Council manifestly have this in mind; for they have invited the District Executive Boards to appoint representatives to serve on an Advisory Committee for the purpose of considering requirements in respect of the constitution and functions of the Association. There are some people who think the London Coke Committee might be extended into a national organization. If this were done, then coke, tar, sulphate of ammonia, and benzole would each have its organization specially attending to its interests.

Neglected Gas Appliances.

Long-disused gas appliances, before being restored to use, ought to be thoroughly tested and, if necessary, overhauled. Some people in the United States have manifestly a free and easy way of re-establishing old gas appliances which at one time rendered them good service. A report states that the temperature dropped rapidly on Christmas Eve, and a fierce, icy gale raged across the country on the Saturday night, freezing solid everything left unprotected. In Chicago, 23° below zero was registered; and, the information says, "there were no fewer than 250 fires in that city alone, most of them due to the use of defective gas appliances pressed into service in frantic efforts to keep warm. In New York, a family of five was wiped out through a flexible tube slipping from a heater during the night." Defective gas appliances and flexible tubing are means of misusing gas.

Nitrate Producers and Synthetic Nitrogen.

It is evident that the nitrate of soda producers are feeling rather uneasy regarding the competition of synthetic nitrogen products in Europe, and are of opinion that the position has to be taken seriously. The estimated contribution of synthetic nitrogen products to the world's production last year is estimated at 480,000 tons; and, though the world's consumption has increased, the feeling is that the situation is one calling for protective steps. One report issued last week suggests that it would be a wise policy for the Nitrate Producers' Association to reconsider the whole system of distribution of nitrate in Europe. It is thought that a changed method of selling is required, which would enable the Association to vary their prices in those markets where financial conditions and the competition of other nitrogen products make it advisable to do so, and at the same time ensure nitrate distributors as good a return on the capital they employ as they can obtain by selling other nitrogenous fertilizers. The opinion is that this would give the Association the possibility of agreeing with other nitrogen producers on prices in European markets, or, if this proved impossible, it would provide them with a powerful weapon with which to fight the competitors.

Coal Subvention Expenditure.

The Mines Department have issued a statement which shows that the cost of the coal subsidy in November was £2,646,209. Adding to this the amount for August and September, £3,407,269, and that for October, £2,644,980, we have a total of £8,698,458 for the first four of the nine subsidy months. It is now anticipated that the total State expenditure on the subsidy will be approximately £22,000,000.

A Valuable Coal-Field.

The Royal Commission appointed, under the chairmanship of Lord Blanesburgh, to inquire into the extent of the surface damage caused by subsidence due to mineral workings have issued an interim report dealing with the conditions in the Doncaster area, in which the apprehended consequences of surface subsidence as the result of underground coal workings are special in character, exceptional in their incidence, and serious in their extent. This big virgin coal-field covers an area of some 200,000 acres; and it is estimated that the total quantity of coal to be sent to bank (assuming the whole coal-field were to be exhausted) would be 4,550,000,000 tons, which would take 400 years to work-out at the rate of 10 to 12 million tons a year. There will be general agreement that this coal should be extracted; but it cannot be doubted that the disturbance of the levels of this low-lying land will, unless adequate remedial measures are found practicable, inevitably bring about the flooding and permanent water-logging of very large areas. Another complication is that it has not yet been determined whether the workable coal stops short of the River Trent or extends beyond that line. The Commissioners recommend that a Special Commission (of competent constitution) should be appointed to consider and make recommendations regarding the general development of the area in the best interests of all concerned.

Pensions and Income-Tax.

The British Insulated & Helsby Cables, Ltd., have been indulging in a long contest with Mr. J. Atherton, Inspector of Taxes, over the question of whether a contribution of £31,874 made by the Company to a pension fund for the benefit of their clerical and technical staff was an admissible deduction in computing the Company's profits for the purpose of assessment to income-tax for the year ended April 5, 1918. The Special Commissioners allowed the appeal of the Company for the deduction, but stated a special case for the opinion of the High Court; and Mr. Justice Rowlatt upheld their decision. The Court of Appeal reversed this. The Company appealed to the House of Lords, who heard the arguments in October, but reserved judgment. By a majority their Lordships have now dismissed the appeal. The Lord Chancellor and Lords Atkinson and Buckmaster were against the deduction, while Lords Carson and Blanesburgh were in favour of allowing it. The view of the Lord Chancellor is that the pension fund was established to offer the employees of the Company a sure provision for old age, and so obtain for the latter the substantial and lasting advantage of being in a position throughout business life to secure and retain the services of a contented and efficient staff. His Lordship regards the payment as being in the nature of capital expenditure, and accordingly the deduction of the amount from profits (though not expressly prohibited by the Act) was rightly held by the Court of Appeal not to be admissible. On the other hand, Lord Carson fails to see that the contribution to the pension fund brings into existence an asset or an advantage for the enduring benefit of trade. However, as already intimated, the Company lost by three to two.

PERSONAL.

The French Government have honoured Sir ROBERT A. HADFIELD by conferring upon him the "Croix d'Officier" of the Legion of Honour, in recognition of his services to science, and of the fact that Sir Robert and Lady Hadfield equipped a hospital in France, which they maintained for the whole period of the war.

In view of the amalgamation of the Brentford Gas Company with the Gas Light and Coke Company, which took place on the 1st inst., Mr. REGINALD J. N. NEVILLE, M.P., has been elected to a seat on the Court of Directors of the latter Company. The "Co-Partners' Magazine" of the Gas Light and Coke Company states that Mr. Neville was born in Bombay, the elder son of the Hon. Mr. Justice J. S. Neville, and educated at Charterhouse, where he has long been remembered as a successful sprinter, and at Trinity College, Cambridge, where he took honours in the Classical Tripos and obtained the Winchester Reading Prize. Called to the Bar in 1887, he was a pupil of the late Mr. W. O. J. Danckwerts, K.C., and practised for long at the Parliamentary Bar. He has contested many elections, sat as M.P. for Wigan from 1910-18, and is now M.P. for East Norfolk. Like his father, who was also a Director of the Brentford Gas Company, he has for many years taken a keen interest in the gas industry, and has been a member of the Board of the Brentford Company since 1892, and Chairman of Directors since 1913.

There was a pleasing event on Monday, the 28th ult., at the Southall Works of the late Brentford Gas Company, when Mr. F. H. G. MORRIS, the Engineer, upon his retirement after having been in the service of the Company at Brentford and Southall for a period of 32 years, received a testimonial of esteem in the presence of the officers, staff, pensioners, and several hundred workmen. The presentation, which was made by Mr. P. Hulme Hornby (Assistant Engineer), consisted of an inscribed gold cigarette case and match box for Mr. Morris and a platinum and gold-mounted diamond pin for Mrs. Morris. Mr. Hornby pointed out that Mr. Morris had been Engineer at the Southall Works for the last 17 years, and during all that time he had been their friend as well as their Chief. The qualities which had endeared him to them were his high sense of honour and integrity, his human sympathy, and the fact that he was a really good sportsman. They would also always remember the interest that Mrs. Morris took in the employees who served during the war, and in those engaged at the works generally. Suitable acknowledgment was made by Mr. Morris, who, it may be remarked, is a son of the late Mr. Frank Morris, who was a Director of the Brentford Gas Company.

Mr. HYDE C. BURTON (son of Mr. E. L. Burton, and associated professionally with him), as the result of his form with the Richmond Rugby Football Club and convincing displays in the last two Trials, has been selected as right-wing three-quarter for England in the forthcoming International at Cardiff. We tender him our warmest congratulations.

OBITUARY.

Reference will be found in our "Editorial Notes" to the sad loss sustained by Mr. C. F. BOTLEY, by the death on the 4th inst., after a long illness, of his wife, ELLEN JANE, aged 54. The funeral will be at Holy Trinity Church, Hastings, next Friday, at 2 o'clock.

Mr. J. H. DAVIES, formerly Gas Manager at Oswaldtwistle, has sustained a bereavement by the death of his son Frank, which took place in South Africa.

The death has occurred at his residence, Lyzwick Hall, Keswick, of Mr. SAMUEL JAMES DITCHFIELD, a former Director of the Sunderland Gas Company. Mr. Ditchfield, who was about 90 years of age, was for many years Agent to the late Marquess of Londonderry, and retired about 1910. Besides his long connection with the Londonderry family, and the Londonderry Collieries and fleet of steamers, Mr. Ditchfield was largely instrumental in forming the Seaham Harbour Dock Company.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Jan. 8.—CHEMICAL ENGINEERING GROUP.—Burlington House, Piccadilly. 8 p.m.

Jan. 9.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION. Meeting at Cardiff.

Jan. 12.—INSTITUTION OF GAS ENGINEERS.—Advisory Committee on Education.

Jan. 12.—NATIONAL GAS COUNCIL.—Meeting.

Jan. 12.—FEDERATION OF GAS EMPLOYERS.—Meeting.

Jan. 13.—INSTITUTION OF CHEMICAL ENGINEERS.—Burlington House, Piccadilly. 8 p.m.

Jan. 13.—INSTITUTION OF GAS ENGINEERS.—Emergency Committee.

Jan. 14.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Visit to the "Veritas" mantle factory of Messrs. Falk, Stadelmann, & Co.

Jan. 16.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Halifax.

Jan. 16.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Joint meeting with Eastern District, at Edinburgh.

Jan. 21.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting.

Jan. 29.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at Westminster Technical Institute.

Jan. 30.—SCOTTISH JUNIOR GAS ASSOCIATION.—Visit to the Kyle Chemical Company's Works at Irvine.

ELECTRICITY SUPPLY MEMORANDA.

THERE are mixed feelings regarding the progress made by the electricity supply industry during the past year. Some look upon the record as good; others the contrary. We have not the slightest doubt that, having regard to the cold weather at the end of the year, the gas industry will show an excellent business expansion, though feeling somewhat sad over the continued weak position of secondary products, which adversely influences the price of gas. Equally, we believe the electricity business will present an expansion of which it will not be ashamed; and assuredly, if such effort as the industry has put forward deserves reward, then a successful year should be added to its history. The Electricity Commissioners have been working energetically to bring about greater concentration of generation; but this is a slow process, owing to the complexity of established conditions—so gradual must be accomplishment that it will be many years before present plans can be consummated. And not even the Government can hasten the shaping of conditions which will allow of good plant being scrapped, with the view to supply being obtained from a centralized source. There are people in fine concentrated electricity-using areas who are of opinion that the economic position of their supply concerns is going to be impaired by having outside sparsely populated areas appended, and having transmission costs increased per unit of output. For any gains they can detect, they see counterbalancing depreciations; and the net result may not be to their advantage. Over the very best thermal efficiency of electricity generation—between 18 and 19 p.ct.—there is nothing of which to boast; and the outlook does not permit the men of the industry to anticipate a higher efficiency, or that the concentration of generation and more widespread distribution will produce conditions which will enable any further technical improvement to be made. It will be long before the whole of the generation of the country will be on the 18 to 19 p.ct. thermal efficiency basis. The demand is too scattered to permit this; and between the highest and the lowest efficiencies, there is a large area across which movement has to be slowly effected. However, a small amount of progress has followed the concentration policy of the Electricity Commissioners during the year.

Slow Progress to Concentration.

A good deal of attention has been bestowed upon distribution problems during the year. In view of the direction developments are taking, some anxiety has been shown regarding the large share in costs of distribution, and much consideration, without commensurate result, has been given to the question of how to reduce the expenses. The year has also seen big advances in the commercial methods of the electricity supply industry—not only in propaganda, but in the application of direct means for developing business. Assisted wiring is a favourite system, under which the consumer pays more per unit of energy consumed until he has discharged the cost of the installation. Electric prepayment meters have received adoption in some places, and have been denounced in others where they have been tried. Hiring and hire-purchase terms have been applied to electrical appliances in order to increase their patronage. And the two-part tariff system is being pushed forward in order to escape from dual meters and wiring, and to induce larger consumption for domestic purposes at the low secondary rate per unit—the greater the consumption, the lower the average per unit of the fixed and secondary charges. The free maintenance of electric appliances is regarded as a politic and necessary obligation by not a few suppliers of electricity; a strict guardianship being one means of trying to retain the custom. Some housing authorities are compelling their tenants to patronize municipal electricity without the slightest care of the tenant's ability to pay, or of his household economy. The Newport (Mon.) Corporation, however, were denied by Parliament the power to interfere with the liberties of their tenants. The Electricity Commissioners have appointed a Committee to advise them as to what powers are desirable to encourage the development of the domestic load. These are among the matters to which attention has been called during the year. It is well to know something of the methods and new efforts of our competitors, in order that our own methods may not be behind, but (if possible) may be somewhat in advance of, them. The trading status of the electricity industry has been advanced during the year; that of the gas industry has also progressed. We will frankly admit that in this respect each industry has something it can learn from the other.

Business Developing Methods.

There are signs of an opening by the Government of publicity propaganda on behalf of their electricity plans. The "Evening News" last Wednesday had an article, and other papers paragraphs, on the Government electricity scheme. The paper named calls it "the cheaper electricity scheme." How it knows the project will cheapen energy, we have not the faintest idea. It does not make any fresh revelations as to the technical constitution of the scheme; but what it does say as to the general lines of the plans shows that—if our contemporary is correct—they will cost an immense amount of money, which apparently the electricity industry will have to bear, as it is "understood that only a small charge will fall upon the taxpayer." That is almost completely satisfactory; and it would be completely so if no charge were imposed upon the taxpayer. The ratepayers of the country have already paid sufficient in aid of electricity supply. No other industry has ever been nursed as has been this one. However, the manufacturers of electrical plant will rub their hands in pleasant anticipation if the benefits which it is predicted are to come their way. The disclosure of the plans is to be made with the least possible delay, in which relation we read:

Government Cure for National Ills.

> This would enable the Minister of Transport to hold necessary preliminary conferences with the industries which will be directly and indirectly affected. In the latter category fall the gas-producing concerns, which in some respects are the direct competitors of the electricity undertakings, and therefore view the proposals with some anxiety. It is understood that informal conversations have already been held with certain representatives of these interests, and that means will be found to enable them to participate in the profits.

We are restraining ourselves against any undue excitement in respect of the suggested participation in profits; the electricity industry does not love the gas industry sufficiently to permit it to acquiesce in any profit-sharing scheme, or in the payment of any compensation for material, moral, and intellectual damages. What our contemporary means by "participation in profits" is altogether beyond us; we shall only know whether there is any foundation for the prognostication when the wonderful prize packet for the nation is opened. Perhaps it is only right the gas industry should share in the profits to be derived from the scheme, inasmuch as it would seem that everybody else is going to derive some benefit from it, and the gas industry is a big tax and rate payer. According to the "Evening News," the scheme is going to place us before all those countries behind whom we now stand in the matter of electricity supply. When that happy time comes, the scheme will prove to be a panacea for all the ills from which we are now suffering. It will reduce the smoke nuisance in manufacturing towns; it will provide a "slight" reduction in production costs; it will check migration from the countryside to the towns; it will redistribute the population by the encouragement of rural and agricultural industries. Rural industries will rise again, when power can be obtained sufficiently cheaply to permit competition with the more favourably situated town industries. With all this, we are not anticipating being able to pick-up gas stocks at extraordinarily reduced prices. The article distinctly reads as though the Government are manœuvring for public support for their scheme. However that may be, electricians will be interested in the fact that the Gas Light and Coke Company made a new record on Friday, Dec. 4, when they sent out no less than 187 million cubic feet of gas. The Company's output for the seven days ended Dec. 6 showed an *increase* of 250 million c.ft., or 28 p.ct., over the corresponding week of the previous year. What happened in London then must have had proportionate representation in other quarters of the country—in Glasgow, for example, despite the beating of the big drum by Mr. Hardie as to what electricity is doing. We recommend our electrical readers to study the curves and information regarding Glasgow which is given on an adjoining page, together with an editorial comment.

Electrical Exhibitions.

Representatives of the various electrical organizations have been in conference regarding the subject of future electrical exhibitions and exhibition policy. Large and small local exhibitions were discussed, and the frequency with which they should be held, as well as the need for giving electrical support to the British Industries Fair until it becomes as big an event as the Leipzig Fair. A *liaison* Committee was appointed to meet and discuss general principles and to report at a subsequent meeting. The British Electrical Development Association have already decided to be represented at the Ideal Home Exhibition this year. We also see that several electrical films have been developed; and at the last "E.D.A." conference (held at Australia House, Strand), these were exhibited.

Meteor's Foolishness.

"Meteor" of the "Electrical Times" appears to be fond of making foolish statements, and they are recognized as such not only by gas men, but by many electrical men. Here is an example from the issue of our contemporary dated Dec. 24: "We shall not here elaborate the shocking inefficiency of gas heating. The instructed reader already knows that the B.Th.U. in electrical form goes *many times* as far as the B.Th.U. in gaseous form." We invite "Meteor" to put into definite terms the "shocking inefficiency" of gas heating, and to explain, also positively, how it is the B.Th.U. in electrical form goes "many times as far as the B.Th.U. in gaseous

form." We are not surprised at "instructed" people saying they are fed-up with such nonsense.

Gas for Steel Hardening.

An article has appeared in the "Electrical Times" which says categorically that gas is three times as expensive as electricity for steel hardening. It is stated that "the hardening of taps and dies is one of the many applications for which the electric resistance furnace is supreme." We will not go so far as that, though prepared to say that, if we may accept the information given in the article, the Wild-Barfield furnace (which is the one dealt with) appears to have worked satisfactorily, and is no doubt useful for machine shop work of the type described. But the article goes on to say that "gas does not compare well with electricity for this purpose from any point of view. Even on the score of fuel costs, the test results show that, with electricity at 1d. per unit and gas at 3s. 11d. per 1000 c.ft., gas *may be* [not is] three times as expensive as electricity." We advise the writer of those words to read a paper by Mr. T. R. Speck, of the "B.S.A." Company, which appeared in the "JOURNAL" for April 15 last (p. 182), in which he said that "gas-fired furnaces are decidedly the most popular in the Birmingham district." From that paper something will be learned as to the heat efficiencies obtained with gas in the treatment of steel. Further, Mr. Speck's paper is instructive in connection with the statement as to gas being three times as expensive as electricity, in view of the fact that the experience with the small Wild-Barfield electric furnace quoted in the "Electrical Times" article was obtained at the "B.S.A." Tools Company's works, but "permission has not been given to disclose the identity of the firm who supplied the gas figures" with which comparison is made. That is unfortunate. The internal dimensions of the Wild-Barfield furnace are 17 in. long, 11 in. maximum width, 4 in. high; while the gas-furnace is said to have measured 16 in. by 12 in. by 6 in. The comparison is presented as follows:

	Electricity.	Gas.
Output per hour	29·75 lbs.	33 lbs.
Consumption per hour	3·41 units	250 c.ft.
Price of fuel	1d. per unit	3s. 11d. per 1000 c.ft
Cost per lb. of steel	·1185d.	·355d.
Hardening cost per ton	22s.	68s.

Thus the comparison shows that gas costs more than three times as much as electricity at the particular rates applying in the above case. It is unkind to hide the place at which the gas-furnace worked, and the type, as some investigation could have been made into a furnace which shows such remarkably poor results. We are afraid, however, that the information as to gas is not very reliable. Assuming the gas used has a calorific value of 500 B.Th.U. per c.ft., the potential energy represents 10,600 B.Th.U. for each 1d. expended, as against 3412 B.Th.U. with electricity at 1d. per unit. It is stated that the gas-furnace consumed 250 c.ft. per hour, which would be equivalent to 125,000 B.Th.U. per hour, whereas the electric furnace (which incidentally was one-third less in height than the gas-furnace—4 in. against 6 in.) used only 11,600 B.Th.U. per hour, and gave a throughput of work of 30 lbs., as against 33 lbs. with gas. Thus, whereas the electric furnace showed an efficiency of approximately 60 p.ct., the gas-furnace results are equivalent to less than 5 p.ct.! To what foolish lengths our electrical friends will go in the attempt to prove how "supreme" are their appliances! We do not think there would be any difficulty in lowering the gas consumption figures to one-third, while maintaining a reducing atmosphere.

ATMOSPHERIC POLLUTION.

Attention has already been drawn to the Eleventh Report of the Advisory Committee on Atmospheric Pollution, which is for the year ended March 31 (see "JOURNAL" for Dec. 23, p. 777). As in former reports, tables are given for each of the deposit stations—and it may be mentioned that during the year two additional deposit gauges have been installed at Newcastle-on-Tyne and one at Stoke-on-Trent—and in these the deposits are shown in grammes per square dekametre for each month of the year. In addition, the mean monthly deposit—that is, the average of all the months—the summer and winter totals, and the annual total are given. The main results are summarized as follows:

COMPARISON OF MONTHLY VALUES WITH FIVE YEARS' AVERAGE.

Rainfall.—Out of 33 stations the rainfall in the current year was lower than the average in 5 and higher in 27, while in one station it was equal to the average.

Tar.—Out of 30 stations the deposit of tar was lower than the average in 19, higher in 5, and equal to the average in 6.

Insoluble Carbonaceous Matter.—Out of 31 stations the deposit was lower than the average in 14 and higher in 17.

Insoluble Ash.—Out of 31 stations the deposit was lower than the average in 18 and higher in 13.

Soluble Loss on Ignition.—Out of 31 stations this was lower than the average in 15 and higher in 16.

Soluble Ash.—Out of 31 stations the deposit was lower than the average in 20 and higher in 11.

Total Deposit.—Out of 33 stations the deposit was lower than the average in 21 and higher in 12.

Sulphates.—Out of 30 stations the deposit was lower than the average in 18 and higher in 12.

Chlorine.—Out of 30 stations the chlorine was lower than the average in 18, higher in 10, and equal to the average in 2.

Ammonia.—Out of 30 stations the deposit was lower than the average in 15, higher in 10, and equal to the average in 5.

COMPARISON OF SUMMER AND WINTER DEPOSITS.

Rainfall.—Out of 44 stations, the winter rainfall was higher in 16, while the summer was higher in 28.

Tar.—Out of 36 stations, the winter deposit of tar was greater in 15, while the summer deposit was greater in 20. The deposits were equal in one station—Golden Lane, London.

Carbonaceous Matter.—Out of 40 stations, the deposit was greater in winter in 9 and in summer in 31.

Insoluble Ash.—Out of 41 stations, the winter deposit was greater in 11 and the summer in 30.

Soluble Loss on Ignition.—Out of 41 stations, the winter deposit was greater in 24 and the summer deposit in 17.

Soluble Ash.—Out of 41 stations, the winter deposit was greater in 21 and the summer in 20.

Total Deposit.—Out of 44 stations, the winter deposit was higher in 16 and the summer in 28.

Sulphates.—Out of 40 stations, the winter deposit was higher in 29 and the summer in 11.

Chlorine.—Out of 40 stations, the winter deposit was higher in 35, while in 5 only was the deposit higher in summer.

Ammonia.—Out of 40 stations, in 17 the winter deposit was the higher, and in 23 the summer deposit.

The report states that a curious relation appears to exist between the amount of sulphate deposited and the total impurity. From an examination of the figures available, it seems that the greater the total impurity deposited from the air, the lower the percentage of sulphates. Also, there appears to be a definite inverse relation between the percentage of carbonaceous matter and that of sulphates.

EFFECT OF WIND ON IMPURITY.

The impurity derived from the smoke of chimneys must have its concentration profoundly affected by wind velocity, as this determines the amount of dilution the smoke undergoes. The smoke from a chimney becomes mixed with the air owing to the latter's turbulence. If there was no turbulence, and the wind blew in perfect stream-line motion, we should have long streams of smoke passing down wind and with little lateral or vertical spread. As it appeared that useful information might be given on this subject if a large number of observations on suspended impurity could be plotted against wind velocities, the figures for 1921-24, obtained from the automatic recorder at Victoria Street, were tabulated for the winter days only. The wind velocities at Kew were supplied by the Meteorological Office, and the mean values for the suspended matter for all the observations at particular wind velocities were plotted against the wind velocities. The results indicated a variation of the concentration of impurity inversely as the first power of the velocity, and not as some higher power, which one would expect if there had been a free lateral and vertical spread of the smoke. If there is no wind whatever, then there is no machinery to remove the smoke, and it must simply collect in a pall over the chimney producing it, spreading somewhat owing to the turbulence due to its own emission, and gradually settling down towards the ground. The concentration at any point then would be determined by the rate of emission of smoke and its rate of settlement. In the limiting case the smoke concentration over a chimney must go on increasing until the amount removed by settlement is equal to the quantity added by the chimney—a condition which seems to be approached sometimes during a thick smoke haze in London.

SPECIAL RESEARCHES.

The report concludes by saying that there are many questions connected with atmospheric pollution which call for investigation, among which are mentioned: Observations by lumeter and cube method and by contrast photometer on light obstruction by fog; loss of daylight—as distinct from sunshine—due to impurity; the development of methods for measuring sulphur pollution in connection with stone decay in cities and injury to vegetation; examination of London fogs; and effect of wind velocity on suspended matter in city air.

The report is published by H.M. Stationery Office, and is obtainable from Adastral House, Kingsway; price 5s. 6d. net.

"THE" DECAYING INDUSTRY."

An Instructive Graph for Electrical Enthusiasts.

Glasgow is regarded as a classic illustration when our electrical colleagues desire to prove how their particular industry is "developing," and, by inference, that gas is "just surviving."

Mr. R. Hardie, of the Glasgow Electrical Showrooms, often airs his opinions in the Press, and it would be interesting to hear his explanation regarding the abnormal demand in Glasgow for the product and appliances which he considers have served their day and generation, and await the scrap-heap.

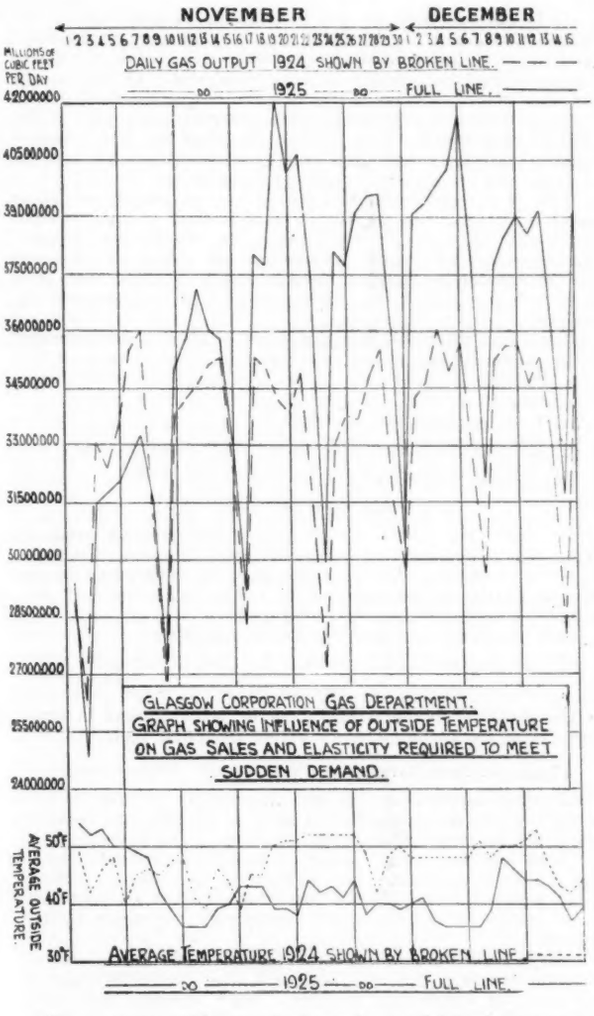
Here are the nuts, in the form of facts, for Mr. Hardie to crack :

(1) Three times within a month the Glasgow Gas Department's own record for daily output has been broken.

(2) On Christmas Day, 1925, the Glasgow gas consumers roasted the turkey, warmed and illuminated their rooms, and washed-up afterwards to such an extent that they used 7 million c.ft. more gas than was used on Christmas Day, 1924.

(3) During Christmas week, 1925, the Glasgow public—who are supposed to be going crazy about electricity—used 33½ millions more gas than they did during Christmas week, 1924.

(4) These Glasgow people during the past seven months have been so enthusiastic about electric appliances that they have requested the Glasgow Gas Department to fix no less than 27,000 extra gas appliances in their houses, workshops, offices, churches, &c.



The accompanying graph shows how quickly the consumers turned on the gas when the thermometer fell recently. Even this record was beaten on Christmas Day, 1925, when the total output of gas reached 43 million c.ft.—all-electric schemes notwithstanding!

Leeds University Lectures.—In our advertisement columns to-day, an announcement appears regarding the Special Courses of Evening Lectures in the Department of Coal Gas and Fuel Industries (with Metallurgy) at the Leeds University; also as to instruction in fuel calorimetery and pyrometry.

THE FILM IN INDUSTRIAL WORK.

By J. W. C.

[Reprinted from "West's Gas."]

It is about five years ago since West's Gas Improvement Company produced the first film showing Glover-West vertical retorts in operation and under construction. They had then the distinction of being the first in the gas industry to apply the cinematograph to the problem of giving publicity to a technical process; and during the past five years many thousands of engineers, directors, and other persons interested in gas-works construction have seen this film in this country, in Australia, America, Scandinavia, and in several towns on the Continent.

Like every other art, the film has its peculiar limitations. The first and most obvious of these arises from the fact that, as each separate exposure of the film is equal to a snapshot taken in the 150th part of a second, it is only possible to get a satisfactory result in a good light. When filming outdoor operations, the weather is the ruling factor. During the taking of the new film, many hours were spent waiting for the sun to come from behind the clouds. Frequently, when he did appear, the scene would be changed—it was the dinner hour, or that part of the plant for which the camera had been set had been stopped, and would not be working again until the next "draw." On one occasion the camera was set in beautiful morning sunshine—and then rain set in for the rest of the day.

Interior views must always be artificially lighted, just as a snapshot indoors requires the use of the flashlight. But for the film the flashlight is useless. It must be a continuous light, and for this purpose portable arc lamps of special construction are employed. These lamps, with all their gear, are heavy and cumbersome instruments, so that when we were on tour from one installation to another, the luggage was considerable. Think of the camera and its fittings in a strong case weighing half a hundredweight, the heavy tripod, cases of film, four sets of portable steel-framed arc lamps, each set occupying a wooden box, with still another heavy box containing all the switchgear and electrical fittings—to say nothing of the four large coils of armoured cable—and you will see that we might be well pleased when we got the whole impedimenta safely to the destination. Railway officials everywhere eyed us with suspicion; and it was not every time that we were successful in getting the apparatus passed through as "Instruments for exhibition purposes."

The second limitation of the cinema for this particular purpose arises out of the nature of the subject itself. The most striking characteristic of the continuous vertical retort from an outside point of view is the entire absence of apparent activity. The real business of carbonization takes place completely out of sight, within the retort setting. The action of the heat on the complex molecules of the coal cannot be seen, and, therefore, cannot be filmed. All that can be directly recorded by the cinematographic camera are the few manual operations such as opening and closing the coal valve, testing the descent of the charge by means of rodding at the top mouthpiece, opening the bottom discharging doors and feeding the coke to the conveyor, and periodical charging of the producers. All these are secondary matters. To make visible the principle of the Glover-West system we have had to resort to "moving drawings," much in the same way as those used for the presentation of our friend "Felix." Special drawings were prepared at the works under the tutelage of the expert cinematographer.

In addition, therefore, to some fine new moving pictures of coal and coke handling plants, waste-heat boilers and the several operations of attending to vertical retort installations, we have moving drawings showing the principle of the Glover-West system, the design of the setting, and the action of the lip-bucket conveyor.

The new film, after all the time spent and the miles journeyed to London, Cardiff, Carlisle, Coventry, Norwich, and Plymouth, is shown on the screen from beginning to end in just over 30 minutes. Copies of the film will be sent, as before, to Australia and the U.S.A., and others will be available for the use of lecturers and engineers who wish to explain the Glover-West system to students and clients in this country and on the Continent of Europe.

"The Real Micawber."—Bearing this title, a booklet of great interest has been written by T. P. Cooper, of the York Gas Company, and published by Simpkin, Marshall, & Co., Ltd., London. In it the author shows the remarkable similarity between Dickens' Micawber and a certain Richard Chicken, of York, whose chequered career was beset with shabby troubles and misfortunes. Micawber was a thoroughly good-natured man, and as active a creature—about everything but his own affairs—as ever existed. Chicken was similarly disposed. He had the same genteel air, the same farcical deportment, and the same condescending roll of voice that Dickens gives to Micawber. Another characteristic of Chicken was his lofty style of composition and conversation, so whimsically portrayed in his immortal counterpart. The booklet, which contains a wealth of new information, cannot fail to interest admirers of Dickens. It is published at 1s. 6d. net.

MEASUREMENT OF COAL.

[Extracts from a Paper by J. E. Lea, B.Sc., M.I.Mech.E., before the Institution of Civil Engineers (Manchester and District Association) on Dec. 16, 1925.]

The greater portion of this paper was devoted to proving the truth of the statement that equal volume means equal weight. The author had four similar buckets, each filled with a different grade of coal, from 1½ in. nuts to ⅛ in. grains. All weighed the same, much to the surprise of some of those who attended the meeting.

According to Hutton's tables, said Mr. Lea, the average specific gravity of all coals in the United Kingdom (excluding heavy anthracites and brown-black coal) is 1·283. If Welsh coals are excluded, the specific gravity is 1·271.

SCREENED OR GRADED COAL.

It is easy to prove—assuming, of course, that coals of the same specific gravity are being dealt with—by mathematics that equal volume means equal weight.

For example, assume that a cubic foot box is filled with a sphere of coal 12 in. in diameter. The volume of this sphere is 904·8 cub.in. Assume now that, instead of a single sphere there are 216 2 in. spheres superimposed. The total volume of these spheres is 904·8 cub.in. The ratio

$$\frac{\text{volume cube}}{\text{volume sphere}}, \text{ in each case, } = \frac{1728}{904{\cdot}8} = \frac{1{\cdot}91}{1},$$

or p.ct. voids = 47·6. This same reasoning is true, however, small in diameter the particles may be.

Although graded coal is not usually supplied in the form of footballs, cricket balls, or marbles, it appears to behave as if this were the case, and irregular pieces of coal seem to act almost as if they were spherical. The average percentage of voids in graded coal is about 42·5, which does not differ very greatly from the 47·6 p.ct. for artificially superposed spheres. Moreover, with spheres packed loosely or naturally into a box, the percentage of voids would be less than 47·6, and would be approximately the same as for graded coal. In other words, a cubic yard of coal in 3-in. lumps will weigh not only approximately, but exactly, the same as a cubic yard of ½-in. peas.

PHILADELPHIA FIGURES.

The following table gives the results of some tests made on graded anthracite coal in Philadelphia.

Size of Coal.	Weight per Bucket. (Average of Four.) Lbs.	P.Ct. Variation from Average (30·10 lbs.).
4 in. to 5 in lumps	29·56	− 1 89
About 3 in. lumps	30·50	+ 1·33
About 2½ in. lumps	30·19	+ 0 30
Chestnuts (1¼ in.)	30·25	+ 0 50
Peas (¾ in.)	30·00	− 0·33
Buckwheat	30·87	+ 2·56
Fine coal screenings (⅛ in. and less)	29·31	− 2·62
Rice coal	30·10	*Nil*

UNGRADED COAL AND MIXED SLACK.

When coal is of a mixed character, the weight per cubic foot is somewhat greater, but unless the coal is artificially shaken down, to enable the fine particles to fill up the interstices, or unless there is a very great difference in the sizes of the pieces, little difference is caused in the weight per cubic foot.

Mr. Lea said he had the idea that one reason for this phenomenon is what might be termed the "automatic segregation or grading of particles of different sizes"—*e.g.*, if a mass of mixed nutty slack be tipped out, or poured out, upon a level floor it will generally be noticed that equal-sized particles tend to get together, the finer particles remaining at the top and the larger pieces rolling down to the bottom. In other words, similar-sized pieces tend to arrange themselves in stratified layers. This being so, the principle of equal volume, equal weight, holds good for each segregated batch or layer; and, therefore, the principle is applicable to the whole mass.

In support of this theory Mr. Lea gave the following table (from Hutton's book on "Steam Boiler Construction," p. 23).

Description.	Weight of 1 C.Ft. of Loose Coal Heaped.	Bulk of 1 Ton of Loose Coal Heaped.
	Lbs.	C.Ft.
Welsh coal	52·1	43·2
Newcastle	50·3	45·5
Lancs.	48·6	46·0
Derby	45·8	47·4
Staffs.	47·0	47·5
Yorks.	47·6	47·0
Scotch	49·2	43·0
Averages	48·8	45·7

The following information was obtained from Mr. Wheelwright, of the Blackburn Corporation Electricity Works, for the weights per cubic foot of dry graded coal of various sizes.

Average Size.	Weight per C.Ft. Lbs.
2 in.	48½
1 in.	48
½ in.	48¾
¾ in.	46
Peas and dust	47
Average	= 47·6

Comparing the above figures for graded coal with the 48·6 lbs. per c.ft. given by Hutton for mixed loose Lancashire coal, the close agreement is very striking.

This is only one instance out of many where the author has observed the same kind of results. In other words, a cubic foot of ordinary mixed coal or slack, under ordinary conditions, does not weigh much more—if anything more—than a cubic foot of graded nuts or peas. Measurement by volume is only a means to an end, and that end, of course, is dry weight.

MOISTURE IN COAL.

It is obvious that the mere weighing of coal, unless due allowances are made for moisture, may be very misleading; and in many boiler houses great doubt and confusion exist as to the actual net weight of coal consumed. Owing to the peculiarities of our climate, boilers are frequently debited with large amounts of coal which they never receive; and, at the end of each month, it is difficult to make the coal accounts balance, for the reason that only gross weights have been recorded, and no allowances made for moisture.

This is the point where measurement by volume comes in most strikingly, for the simple reason that a given weight of actual coal occupies the same space whether wet or dry. Measurement by volume entirely ignores either the presence or the absence of moisture, and therefore in many cases it is a truer measure of the actual coal than measurement by weight.

Assuming, therefore, that the object of all coal measurement is to get at the net, or dry, weight of the coal, it is clear that the principle of equal volume, equal weight, is a most important one.

(1) It is absolutely true in the case of graded coal;
(2) It is approximately true in the case of mixed coal;
(3) It is approximately true even with wet coal.

SAMPLING OF COAL.

To obtain the fullest advantage and the greatest accuracy from the volumetric system of coal measurement, and especially in such cases where there may be differences in the specific gravity of the coal and the weight per cubic foot, systematic sampling is all that is required.

Such sampling may serve a double purpose:

(1) For determining the average dry weight per cubic foot.
(2) For determining the average B.Th.U. per lb.

The variation in the B.Th.U. per lb. is far greater in many cases than the variation in its weight per cubic foot.

PRACTICAL APPLICATIONS OF VOLUMETRIC MEASUREMENT.

Chain-Grate Stokers.—Is not this simply a case of coal being fed into a furnace in the form of a stream of constant width but of varying depth and velocity? The velocity is an artificial one, but at all points in the cross-sectional area of the stream is constant. The problem of measurement, therefore, resolves itself simply into the question of providing some means for automatically multiplying the depth by the velocity.

Conveyors.—Miles of conveyors of all kinds are in use all over the country, conveying coal and other materials along in the form of continuous streams. Such streams have only to be guided into channels of definite width, and so arranged that they are "full flowing" all the time, in order to measure them volumetrically.

Retort or Ram Type Stokers.—These are simply cases of coal being pumped like water into furnaces, and it is only necessary to provide the means for measuring the forward displacements of the rams or plungers in order to get the total volume of coal passed.

It may be mentioned that the "Cubi-Meter" manufactured by the Lea Recorder Company, Ltd., seems to be of considerable interest to gas-works. At present the firm are making a machine to measure 40 tons an hour for a large gas-works in Lancashire.

COKE COMPETITION PAPERS

Which obtained the Ten-Pound Awards in Section I.

In the special Coke Competition Number, issued on Nov. 9 last, we published *in extenso* the papers in the Coke Competition (which was organized by the "Journal," and for which the Woodall-Duckham Companies provided £1000 to be awarded to the winners) which secured prizes above £10. We now propose, as opportunity permits, to publish the papers, or extracts from them, which received £10 awards. This week, we deal with the three in Section I.—viz., those by "Eliya," "Jovax," and "Reformare."

THE MANUFACTURE OF COKE OF THE MOST SUITABLE QUALITIES FOR DOMESTIC AND INDUSTRIAL PURPOSES.

By "ELIYA."

[Mr. W. W. TOWNSEND, General Manager and Engineer, Colchester Gas Company.]

Gas-works coke produced by high-temperature carbonization can be manufactured and prepared in such a way as to be suitable for these purposes, if special care is taken to produce a material fairly uniform in quality, low in ash and moisture, and carefully graded. The practical difficulties are, however, serious.

To ensure a low ash content in the coke, all the coal carbonized should be washed to remove foreign matter, and coal should be purchased from the collieries with a guarantee that the ash content shall not exceed a certain figure. It is possible to purchase washed nuts from certain coalfields, but even in these the ash content varies widely, and careful and regular analysis of all deliveries is the only means by which the buyer can endeavour to limit the variations in the quality of the coal supplied, on which depends largely the quality of the coke produced.

A very large part of the gas coal produced in this country is, however, sold in the unscreened and unwashed condition; and undertakings which are at a distance from the coalfields, and take their coal by sea, are compelled, for economic reasons, to purchase this material, which, from the point of view of gas production, is a good fuel and produces coke eminently suitable, because of its texture and hardness, for industrial and many domestic purposes, but has the serious drawback of a high percentage of ash.

The collieries have repeatedly been urged to instal screening and washing machinery; but in the present condition of the coal industry, it does not seem likely that the necessary capital will be forthcoming to enable this to be done. The gas industry has hitherto, in the main, selected coals for their gas making qualities chiefly, and has produced coke as a bye-product varying from place to place, and having concentrated in it all the ash contained in the original coal.

If the coke is to be treated not as a bye-product, but as a chief product, the same methods which have been adopted by the coke oven industry must necessarily be applied to the production of gas coke. At coke ovens all the coal used is washed as part of the process, and gas-works will be obliged, eventually, either to buy washed coal, or instal plant to do the washing themselves. There are, of course, many works too small to adopt the latter proposal; but the greater part of the coke produced is made in large works, where coal washing would be quite practicable.

The second point to be considered is the blending of coal; and attention to this matter would assist very materially in the production of coke having the required characteristics—such as density, hardness, and porosity. Many coals of a non-coking character, which can hardly be used alone, if blended with suitable coking coals produce a good coke, and, by neutralizing the swelling tendency of the strongly coking coals, produce a less dense coke more suitable for certain purposes. In practice it is usual, owing to the arrangement of the coal handling plant, to carbonize for days a particular coal, and then to change over completely to a shipment of another variety with entirely different characteristics, which naturally requires altered treatment in the retorts, and produces coke of a different quality. The coal handling plant can, however, be so arranged that the various qualities of coal are stored in separate compartments of the stores, and the necessary percentages drawn from stock each day to produce the blend required. Where a system of tunnel conveyors under the coal stores is in use, or a telpher system for reclaiming coal from stock, this should not be difficult to arrange.

With regard to carbonization, either horizontal retorts machine charged with heavy charges or continuous vertical retorts are capable of producing coke suitable for general use. The horizontal coke, being denser, is superior for industrial purposes, and the continuous vertical coke, being more porous, is superior for domestic purposes. Apart from the question of texture, the continuous vertical coke has an advantage over horizontal coke in being low in moisture, owing to the fact that it is discharged from the retorts in small lots, and partially cooled.

Coke from continuous verticals, if the coal is washed or carefully selected, is, in fact, if properly graded, a very good fuel. Unfortunately, the same name is given to coke produced by all methods from all coals, and it is the extreme variation in the quality of gas coke which is its principal handicap.

The quenching of a large mass of hot coke from a horizontal retort is a much more difficult problem. A hot coke conveyor breaks up the coke, drowns some of it in water, and leaves large lumps incandescent, to cause troublesome fires in the hoppers; also the wear and tear on the plant is very heavy. Telphers are too slow, and sudden immersion of a large skipful breaks-up the coke. The quenching bench idea is free from the drawbacks of the coke conveyor as regards wear and tear, and the coke can be quickly removed from the retort house so that its discharge keeps pace with the speed of the charging machine; but in practice the coke slides down in a heap to the bottom of the bench, and, in quenching it with a high-pressure jet of water, the coke on the exterior of the heap is drowned, while that on the interior is still red hot. Also the coke when "quenched" has an unpleasant black appearance.

The dry quenching in chambers (Sulzer method) appears to be too costly and slow. In the writer's opinion, the proper method of quenching large masses of incandescent coke is that adopted by the coke oven industry, who sell their coke with a limit of 5 p.ct. of moisture. That is to say, the coke must not be quenched in a heap, but spread out in a thin layer so that the water can reach every lump. A coke quenching and loading machine has not, as far as the writer knows, been applied in a gas-works, but it would appear to have many advantages. Where possible, the quenching, screening, and loading into trucks should be done in one operation, avoiding storage in hoppers, &c. The Goodall quenching machine can be adapted to horizontal retorts. The coke is discharged on to a revolving table, which is kept in motion by an electric motor. The coke is spread out on the table in a thin layer as it revolves, and is quenched by a water spray with the use of a minimum quantity of water. The machine is enclosed, so that the steam evolved in the quenching does not escape into the retort house, but, by excluding air from the quenching machine, assists in the rapid cooling of the coke. When sufficiently cooled, the coke is discharged from the machine by opening a door, when the centrifugal force (caused by the rotation of the table) assists in the discharge of the quenched coke through a shoot. The shoot may discharge the coke over a screen direct into trucks, telpher skips, or on to a rubber belt for conveyance to the screening plant.

To sum up, the writer's proposals are:

(1) Selection of coals.
(2) Washing, either at colliery or gas-works.
(3) Blending.
(4) Retorting at high temperature as at present.
(5) Quenching in thin layers as stated.

By this means a coke low in ash and moisture, and of suitable texture, may be produced. The proper grading of such coke is dealt with under Section II.

COKE PRODUCTION.

By "JOVAX."

[Mr. DONALD BAGLEY, F.C.S., 92, Victoria Street, Westminster, S.W. 1.]

The compulsory use of smokeless fuels for domestic or industrial purposes is an ideal aim—always assuming that reasonable service efficiency is possible, and that the adoption of a prepared heating medium in lieu of raw coal does not add appreciably to the cost of providing domestic heat or the steam required by industry. To anyone familiar with New York, where the use of other than relatively smokeless fuel is prohibited, the hygienic atmosphere at all times forms a pleasing contrast with London, which pays millions sterling for its adherence to what must be regarded as a crude and unsatisfactory method of securing warmth and industrial power.

For over twenty years I have been an interested observer of the many attempts to produce a smokeless fuel for do-

mestic purposes; the so-called low-temperature processes forming the majority of these probably still experimental endeavours. I remain unconvinced that a satisfactory solution has been discovered, or that the inherent characteristics of such low-temperature processes are economically sound, for within my own sphere progress has followed a diametrically opposite course. Moreover, in the gas industry the trend is on parallel lines, and low-temperature systems have never received favourable notice, for the simple reason that the gas engineer regards low carbonizing temperatures as a retrograde policy. The crucial point obviously is the net cost of the prepared fuel and its value in contrast with raw coal.

Relatively low ignition temperatures and ready combustibility are doubtless features of the low-temperature product when the contrast is with gas or furnace coke. These may be valuable, more especially from the aspect of the domestic range or fire-grate; but there is a strict limit to the price a domestic consumer is prepared to pay for these advantages. *Per contra*, while retaining the economic advantages of rapid carbonization at high temperatures, can the solid product be improved and rendered suitable for domestic or industrial service? This is the objective of our endeavour.

My research in this direction has been spasmodic, probably crude, and largely confined to metallurgical coke; but even so the results were not altogether disappointing, and they appeared to suggest that practicable modifications in the domestic grate would at all events lessen the difficulties. Coke broken to roughly 2-in. cube, containing less than 1 p.ct. of moisture (and in this instance of low ash content) can be ignited with wood, and burns steadily in the ordinary "well" of refractory material. The direction of improvement in this type of grate is perceptible, the aim being to increase the combustion velocity. Research and experiment on these lines are still worth while. Perhaps one might consider gas for the initial ignition; I used this in the laboratory and it certainly facilitated combustion, though gas was not charged at 4s. per 1000 c.ft., its value being probably less than 4d. Even at the higher figure the cost is less than bundled firewood. An approximation—though not quite as effective—consisting of a refractory slab placed on the cast-iron bars of an ordinary open type domestic grate gave moderate results. This suggested the importance of low ash, and particularly low moisture, and the avoidance of metal bars.

I will now interpose an abstract from an article by Prof. C. V. Boys, F.R.S. He states:

> I have, in the dining room of my house in the country, a fireplace in which I burn common gas coke. . . . If you wish to burn coke on the domestic fireplace, you should do everything the exact opposite of what is generally believed to be necessary. I do not use broken coke; I do not exclude small coke or dust, because in the country I have to take what I can get; I do not keep the coke dry, but for want of accommodation my store of coke is left out in the rain and snow. It is no advantage that the coke should be wet—quite the reverse—but even so I have no trouble with the fire. . . . Most important, all the iron from the fireplace has been removed, no firebars are left, no metal is in contact with the fire, but the fire is built upon a smooth hearth of brick, so that no air can be supplied below the fire. I have had this in use now for ten years.

Prof. Boys states that this coke fire is easier to manage than a coal fire, can be lighted so as to get hot in less time than a coal fire, and does not go out incontinently if left for several hours. He adds, as a labour-saving item, that there is no metal to polish.

Prof. Boys' fireplace initially consisted of the well with cast-iron grid superposed on the ash well, and fitted with the common air ducts. He removed the grate, filled up the ash well to a point 1½ in. below the hearth with refractory material, leaving a smooth surface, and closed the lower air ducts. Prof. Boys explains that "the hearth becomes covered with a layer of red-hot ash, and the air for combustion, preheated by passing slowly over this, and passing slowly through the interstices of the coke, has time gradually to combine with the carbon, so the bulk of the air, if not all, is utilized."

Here there are no qualifications as to ash or moisture, beyond a reference to the retention of unburned coke when re-lighting. So eminent an observer has solved the problem for us.

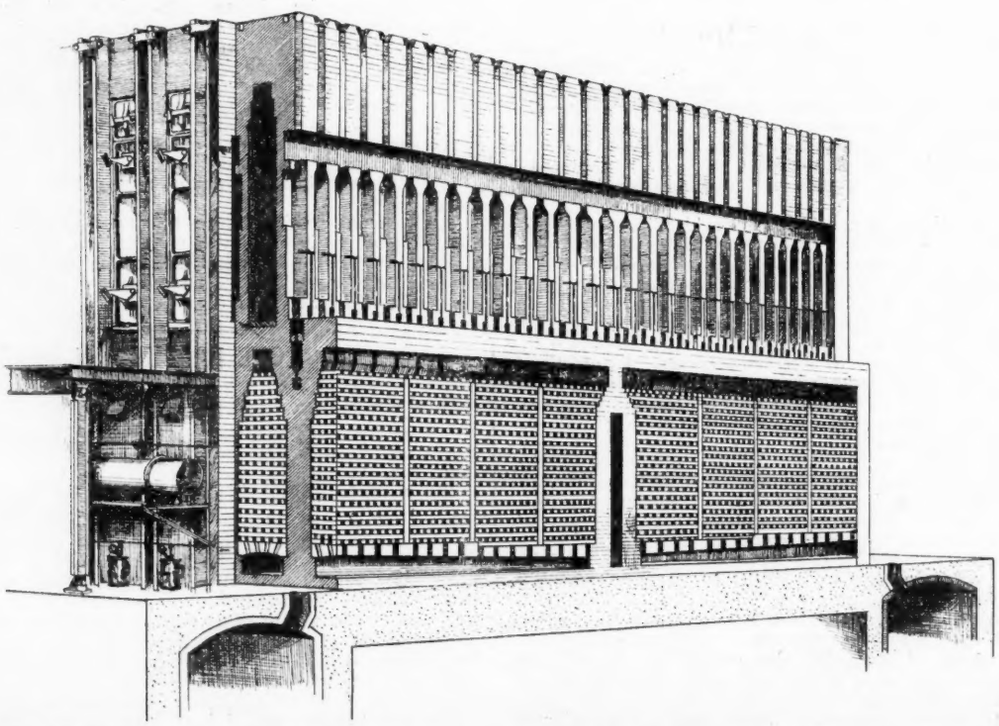
I have been at some length to explain one most important factor—viz., that with very simple means ordinary gas coke or metallurgical coke can be burned almost with the ease of coal—because it has a direct bearing on the economic issues involved. Moreover, it suggests that the same simplicity shall govern our ideas in any changes we seek to make in the means of carbonizing at our disposal, and more especially when industrial capital is a problem acute to most of us.

There are three possible sources of domestic or industrial coke:

(*a*) The gas-works, whose first function is the supply of gas for lighting or heating.
(*b*) Coke works, designed for the production of metallurgical fuel.
(*c*) Domestic coke works, a limited feature of the carbonizing industry in the U.S.A.

Mass production affords the cheapest means of manufacture, so that I lean towards item (*c*) as the eventual economic source. But unless the gas evolved in the process of carbonization can be advantageously sold at prices which tend largely or completely to offset the total costs of conversion, the advantages associated with massed effort tend to disappear, and the gas-works, with monopolistic advantages in this direction, leads. Obviously the choice of oven *v.* gas retort is then one for discussion. In my opinion its solution will favour the oven if—an important qualification—domestic coke figures as a continuous and stable article of commerce either under compulsory powers or otherwise.

The oven shown in the drawing I have designed for the production *inter alia* of domestic and industrial coke. Its prototype exists on the other side of the Atlantic. There is little in it calling for comment; it introduces one or two proved innovations, the principal characteristic being large output and high gas yield. I have found that the yield of bye-products—*i.e.*, ammonia, benzole, and tar—is almost normal. Gas of



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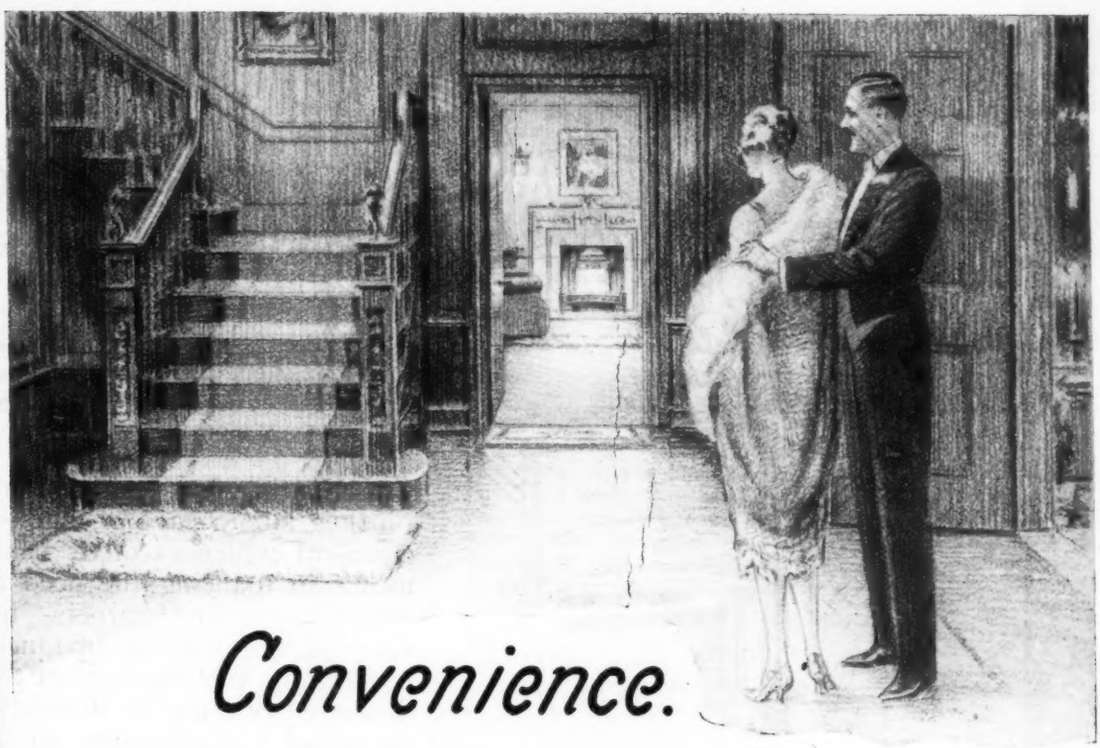

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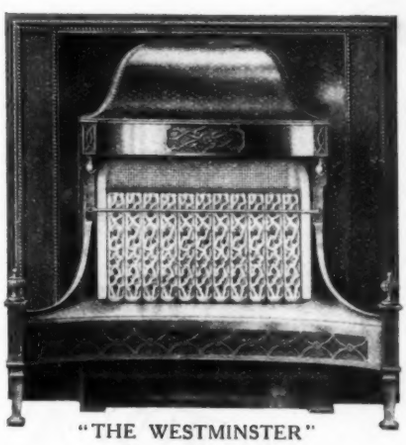

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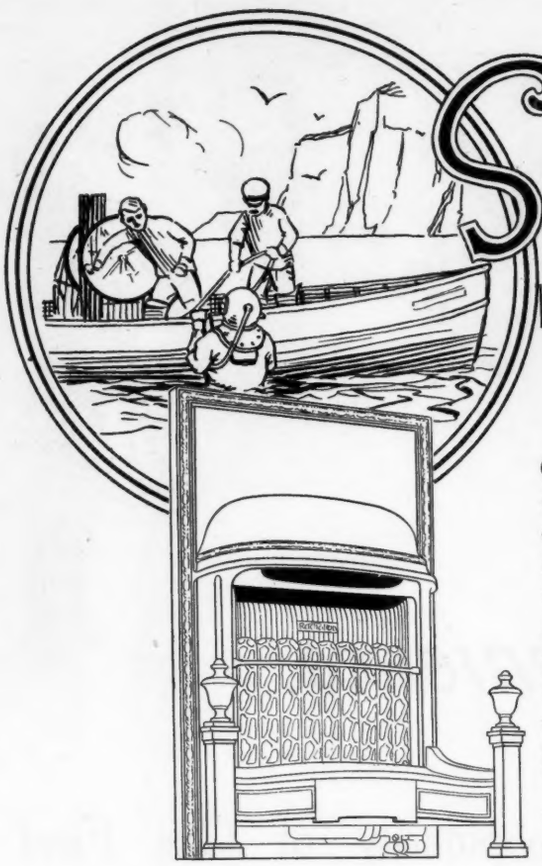

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Special Address for Night T'grms: "'Phone from Leeds Draketed, Halifax 543."

J&W
150-151

Service and Thoroughness

over 500 B.Th.U. exceeds 12,000 c.ft. Consider for a moment that the structure requires 150 tons of silica material, and is capable of carbonizing 7000 tons of coal annually, yielding between 4500 and 5000 tons of coke, and contrast this with any low-temperature system. Twelve tons of coal are charged, and the corresponding yield of coke discharged, in a few seconds, and the whole of the operations are considered from the mass aspect. In my opinion any changes are possible only in the direction of increased mass if industrial or domestic cokes are to be produced on terms which eventually will spell economy, in contrast with raw coal, to consumers.

There is another advantage associated with rapidity of carbonization and high temperature—these enlarge the source of raw coking fuels, which even now tend to be restricted. For this reason, while in no way disparaging the importance of blending selected fuels where permissible—I have purposely avoided any reference to academic subjects as being impracticable at this juncture. I do stress, however, the advantage of cleaning coal to the highest possible degree before carbonizing, and more especially for the production of a domestic smokeless fuel. In metallurgical operations, we have means for dealing with the resultant ash. Incombustibles amounting to 12 p.ct.—taking a favourable view—in the domestic sphere largely nullify the smokeless advantage. Despite Prof. Boys' views, I believe the importance of coke relatively free from moisture has not been realized. It is easily capable of retaining 10 p.ct., and the cost is burdened to this extent, to the disadvantage of the consumer. Moreover, water has to be vaporized at the expense of the fuel—not a very serious item, but something which may detract from what we seek, a stable and continuous demand for the produce. Moisture-free coke can be produced by cooling with inert gases in place of quenching with water; and I certainly believe that a large percentage of the sensible heat of the glowing product as discharged can be returned to the heating system, if high capacity producers displace individual generators—a feature, in contrast with gas-works practice, of the oven I have designed.

The system we employ for treating the carbonized fuel from its exit from the oven to the storage bin should properly be dealt with under the appropriate section. It may, however, briefly be described here. The sole aim is economy in labour. The coke is discharged in the usual manner to a travelling car which empties directly into the cooling chamber. From this it is automatically ejected to the screens, and, the oven being from 12 in. to 14 in. in width, breakers are unnecessary, only breeze and dust being separated and dealt with individually. In place of bins, the discharging arrangements of which tend to the production of further smalls, we are designing a simple roofed structure with concrete floor from which the coke will be handled by light oil engine shovels. I am not yet in a position to give any figures as to actual costs. The arrangement is more flexible for charging lorries, and may offer some advantage for bagging and weighing. It avoids the fixed point, and costs less than the bin, while giving such weather protection as is reasonably required.

Beyond offering my opinion as to the advantages of moisture-free and low ash cokes, I am not competent to express any suggestions for the gas-works. We are at one as regards the maximum attainable temperature for carbonization. Both coke ovens and gas-works realize the advantage of silica for retorts or ovens, and I am glad to observe the gas industry goes even further in testing the merits of carborun lum for its carbonizing chambers.

Again, I am on common ground in presently rejecting low-temperature processes as economically unsound. Ordinary gas coke or even metallurgical fuels being combustible in domestic grates with the simplest and cheapest means of adaptation, it follows that with (even without) the limited improvements suggested, all that is necessary is to educate the public to the facts. In—what I believe to be temporary—an oil age, liquid fuels tend to fascinate, and adherents of low-temperature processes have made good use of the fashion of the moment. Thermal unit for thermal unit, steamships burning oil pay nearly fourfold for the privilege, if we neglect the ash, labour, and bulk saving addenda. But the inventive trend is capable of lifting solid fuels towards the same plane, and in witness we have pulverized fuel, high capacity coke gas generators, and charcoal gas driven automobiles, in which continuous improvement is discernible.

Domestic coke should be sold at values corresponding to those of coal. If we select purely arbitrary figures, assigning a value of 0·85 as representing the value of the former, taking coal as unity, the importance of mass production and gas value becomes apparent, as the following table shows:

Pro Forma Production Costs of Domestic Coke.

CHARGES.		RECEIPTS.	
Coal	1·000	Domestic coke 0·85 of 70 p.ct. yield	0·595
Capital, depreciation and other charges	0·075	Gas, 12,000 c.ft. at 9d.	0·450
Labour charges and incidentals	0·125	Ammonia, profit	0·050
		Benzole ,,	0·100
		Tar ,,	0·050
	1·200		1·245

Probably few will agree with these hypothetical values. They are introduced with the objective previously referred to, and show the overwhelming importance of gas values and massed operation. The position of the works governs the former. It should be observed that in assigning unity value to coal, no deduction has been made for the "smalls," which would in the ordinary course be used instead of "household," and it might thereby be correct to take 0·8 instead of 1·00 which would influence the result.

There is fortunately much room for improvement in the methods of distribution of household fuels; and again mass leads, the net result being in favour of large central distributing stations. In this connection the figures emanating from the London Association of Coal Merchants, and given at the request of the authorities, should be studied.

Again, power gas of 500 B.Th.U. at 1s. per 1000 c.ft., if such a proposition were feasible, contrasts favourably with fuel oil, assuming that some heavy surplus became available by reason of compulsory smokeless fuels.

As concerns the use of coke for boiler fires, in my view the most satisfactory method is to preheat the air for combustion. In this way temperatures approximating to those in coal-fired boilers can be attained with the maintenance of high efficiencies and outputs. There are on the market several forms of preheaters, both rotary and static, which permit of useful economies. Thus, the avoidance of any coal admixture is possible, and the true conditions as to smokelessness are observed.

Finally, perhaps again trespassing upon another section, the distribution of this potential source of heat without smoke might be arranged on lines analogous to those of gas, in that the fuel is, and remains, immediately available when required. Any properly organized system of distribution should be capable of effecting an approach to this, thus relieving the storage of intermittent peaks and troughs.

PRODUCTION OF A GOOD COKE.

By "REFORMARE."

[C. BUCHHOLZ, Dammstrasse 73, M: Gladbach, Germany.]

SUMMARY.

The principal aim of a gas-works always has been, and still is, the production of gas of a constant quality. Unless this aim is faithfully observed, not only will the sales of gas decrease, but so also will the sales of bye-products, including coke. Therefore, the first necessity for the production of a good coke is the manufacture of a good gas. Generally speaking, unwashed and unscreened coal is employed for gas making, for the simple reason it is the cheapest. This coal should contain at least 28 p.ct. of volatile matter, but should have an ash content of not more than 6 p.ct. In general, washed nuts yield a coke less dense than that produced from unscreened coal; but the former coke is cleaner. When a gas-works is obliged to use several kinds of coal, it is desirable that the variations between the qualities should not be great, so that, should conditions necessitate, each sort may be carbonized separately without difficulty. On the other hand, if the qualities are markedly different, it is essential that they should be well mixed in order to obtain a uniform coke, though this may be of an inferior nature. As the upkeep and capital costs of a mixing plant are great, such a plant will only be employed when absolutely necessary. There are at present three main systems of carbonization—horizontal retorts, vertical chambers, and inclined chamber ovens. The latter can only be recommended for large works; for, to handle and to quench chamber loads of 5 tons of red-hot coke, expensive transport and quenching plant have to be erected.

QUENCHING OF COKE.

The usual method of quenching coke from horizontal retorts is by spraying cold water on to the coke contained in a wagon made of bands of iron. The coke is damaged badly by this procedure, but it is not worth while to propose improvement, for I think that this form of carbonization will soon disappear. With regard to vertical retorts, the quenching apparatus widely used consists of a De Brouwer trough with transport chain. No system of quenching could be worse than this. The red-hot coke is broken while being dragged along the trough, and is subject to further breakage when it falls into the cold water pit, where it is finally completely quenched. This system has lately been replaced by a method in which the coke from the retorts or chambers falls into quenching wagons which serve not only for this purpose, but also for transport. As these wagons are made of open-work bands of iron, steam used for quenching passes through the basket, and its efficacy is lost. I have therefore built a special type of quenching wagon.

This wagon has a frame of U or angle iron, all fillets being placed in the interior. In this frame a sheet-iron box is freely suspended, the bottom of which is provided with flap doors. No heat can be transferred from the box to the frame, and the wagon itself cannot become red hot, and is thus always ready for service. The actual quenching is done in the following manner. The wagon with its red-hot load is pushed into a quenching tower in which a spray coming from perforated tubes

distributed over the whole surface of the wagon is put in action. As none of the steam now produced can escape upwards, part of the hot steam must penetrate through the bottom layers of coke. Then hot, warm, and finally cool quenching water is used. By this method the red-hot coke is subjected to a gradual cooling, and thus does not break.

On some works resort is made to the dry quenching of coke. This system is excellent, because the heat which is stored up in the red-hot coke is regained, and the coke itself is kept free from water—a very important point. Of course, it does not follow that coke cooled by this method will arrive at its destination entirely free from moisture, because it is usual to transport it in open wagons, and consequently rain will be absorbed. The dry quenching of a chamber load takes six hours; and as for this system a large plant must be erected, I cannot say whether any financial advantage is obtained.

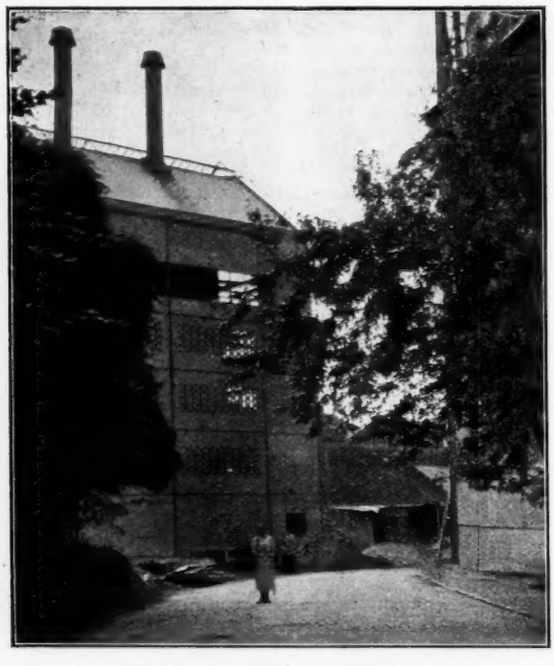
Probably all gas-works use pea coke and pearl coke for steam production, the sale of which is very difficult, and for which only poor prices can be obtained. It is often a fact that, if good plant for quenching, transporting, and screening is used, the quantity of waste coke obtained is insufficient to produce all the steam required on the works, and it becomes necessary to purchase an inferior coal, and use this and the waste coke for steam raising. The small coke, of course, is not used for boiler firing, because a good price can usually be obtained for this quality. The pea coke and the poor coal should not be intimately mixed, but should be brought on to the grate separately, in the form of layers. By this sandwich system, good combustion of both fuels is obtained, in spite of their different nature. It is not, however, advisable to burn coal and coke together in central heating stoves or in ordinary domestic fire-grates.

GLOVER-WEST VERTICALS AT PLZEN.

Guarantees and Working Results.

Plzen is a thriving industrial town situated in the western part of Czecho-Slovakia. It has had a gas-works for over half-a-century; and it is believed that it was the first town in Central Europe to instal a high-pressure system for street lighting.

Having decided in 1923 to replace the old horizontal retort house by a more modern carbonizing system, a Special Committee, including Mr. Kopp, the present President of the Gas Committee, and Mr. Panzner, the Director of the Gas-Works, made a tour of Germany and England, to investigate the best modern systems of continuous carbonization. As a result of this investigation a contract was placed in July, 1924, for the erection of an installation of 16 Glover-West vertical retorts complete with coal and coke handling plants. The actual building of the installation began in September of that year, and gas-making was started in August, 1925. The guarantees given for the plant were obtained comfortably under normal working conditions, and the installation was taken over by the Municipality at a pleasant and well-attended inauguration ceremony on Oct. 31, 1925.



Glover-West Verticals under Construction at Plzen.

The arrangement of the plant closely approaches the ideal. It is compact without being overcrowded, and all the machinery is easily available. To facilitate coal handling and to provide room for easy extension, the retort house was arranged close to the coal unloading wharf, alongside the railway siding, and arrangements were made to utilize an existing narrow-gauge railway to transport unbroken coal from the wharf to the receiving hopper and coal breaker of the installation. A conveyor of the West lip-bucket type completely encircles the retort bench, for the conveyance of broken coal to the overhead storage bunkers in the retort house, and for the transport of coke.

The retorts are of the 33-in. " New Model type," arranged in units of two, and heated from four producer gas generators by means of tiers of horizontal combustion and circulating chambers. The fact that three classes of local coal (one a washed slack) possessing markedly varying characteristics have been successfully carbonized is excellent testimony to the flexibility and degree of control obtainable by the method of heating embodied in this plant. In each case the Director was very pleased with the excellent quality and size of the resultant coke.

Only a few specialities were imported into Czecho-Slovakia for this contract; the major portion of the requisite materials being supplied to West's orders by two local firms.

The following gives a brief summary of the guarantees for the Plzen plant, and the corresponding test results.

GUARANTEES.	RESULTS.
(For an Ostrava coal having 33 p.ct. organic volatile content and a combined ash and moisture content not exceeding 12 p.ct.)	Only a limited amount of Ostrava coal was available, and this was carbonized separately in eight retorts. In a further four retorts a local Masaryk coal was carbonized, these retorts being operated at less than the normal rate and at varying speeds to suit the demand. *Coals Carbonized per 24 Hours.* 1.—Ostrava (Gabriele Mine) = 28,625 kg. (28·168 tons). Proximate Analysis: P.Ct. Moisture . . . . . 2·1 Organic volatile matter . 28·2 Ash . . . . . 7·2 2.—Masaryk coal (per 24 hours) = 9835 kg. (9·68 tons). Proximate Analysis: P.Ct. Moisture . . . . . 5·1 Ash . . . . . 11·1 Organic volatile matter . 28·0 *Total Coal Carbonized per 24 Hours.* 38,460 kg. (38 tons.)
Gas to be made per 1000 kg. of wet coal (Ostrava) 420 cub.m. (15,070 c.ft. per ton).	Average gas made per 1000 kg. of wet coal (combined Ostrava and Masaryk) = 424 cub.m. (15,214 c.ft. per ton).
Calorific value of gas (gross) to be 4500 calories per cub.m. (506 B.Th.U. per c.ft.)	Calorific value of gas (gross) = 4520 calories per cub.m. (508 B.Th.U. per c.ft.).
Gas per retort per 24 hours (average) = 1512·5 cub.m. = (53,414 c.ft.)	Average gas per retort per 24 hours (Ostrava coal only) = 1518 cub.m. (53,610 c.ft.),
Average output per 8 retorts per 24 hours. 12,100 cub.m. = (427,310 c.ft.).	Average output per 8 retorts per 24 hours (Ostrava coal only) = 12,144 cub.m. (428,880 c.ft.)
Fuel consumption on Ostrava coal not to exceed 14 kg. of gross coke per 100 kg. of wet coal carbonized.	Fuel consumption (Ostrava coal only): Gross coke per 100 kg. of wet coal . . . = 12·7 kg. Dry coke . . . . = 12·4 kg.
	Resultant coke = large and very hard. 90 p.ct. of the coke greater than 38 mm. (1½ in.).

In conclusion it should be mentioned that the Masaryk coal gives only an average of 385 cub. m. of gas per tonne at a calorific value of 4500 calories. That is to say, if Ostrava coal alone had been carbonized during the test, the make would have been about 438 cub. m. per tonne at the same value.

DEVELOPMENT AT ALDERSHOT.

New Three Million C.Ft. Holder to be Erected.

THERE was an interesting and significant ceremony last Wednesday, at the Ash Road (North) Gas-Works of the Aldershot Gas, Water, and District Lighting Company, where his Worship the Mayor of Aldershot (Alderman James May, J.P.) cut the first sod in connection with the erection by Messrs. Newton, Chambers, & Co., Ltd., of Thorncliffe Iron-Works and Collieries, near Sheffield, of a new 3 million c.ft. gasholder. The Mayor performed his task on the invitation of Mr. R. W. Edwards (the Chairman and Managing-Director of the Aldershot Company), and in the presence of a number of gentlemen associated with public affairs in the district. The spirit of harmony and appreciation which was manifested throughout the proceedings holds out much promise for the future of an enterprising gas undertaking and of the large area which it serves.

A BRIEF HISTORY OF THE UNDERTAKING.

Before making specific reference to the holder which was the object of last Wednesday's gathering, it may not be out of place to quote, from an illustrated booklet prepared for the occasion, some figures which explain the frequent need for additions to the Company's plant; and, while alluding to the booklet, it may be mentioned that two excellent aerial photographs (by the Surrey Flying Services, Croydon) of the Company's Ash Road (North and South) Works and North Camp and Farnborough Works will be reproduced from that source in the next issue of the "JOURNAL."

The first gas-works to be established on the present site were erected in 1856, and were operated by a private Company, who, after some years of unsuccessful working, were eventually taken over by the present Company in 1866. The Company's area originally comprised the parish of Aldershot, but has made strides from time to time—the first in 1896, when the North Camp and Farnborough Company were absorbed. Again in 1901 futher territory was added, which took in the parishes of Cove, Fleet, and Crookham, with parts of the parishes of Hawley and Yateley, in Hampshire, and the parish of Seale, in Surrey. In 1909, when the Company were re-incorporated under the present title, the area of supply was very largely extended and, in addition, the two small works at Odiham and Hartley Wintney were absorbed; and the area in which the Company were authorized to supply gas was extended to its present limits in 1918. The following figures of the areas of supply at different dates show the extent of these developments:

1866	4,175·6 acres.
1890–1896	19,609·8 ,,
1901–1910	82,221·5 ,,
1918–1925	96,031·8 ,,

The policy of the Company has been, so far as possible, to concentrate gas manufacture at their Ash Road Works, Aldershot; while other stations at Farnborough and Fleet are made use of for storage of gas. The progress of developments at the Ash Road Works has therefore been more or less contemporaneous with the extensions of area of supply; and further lands have been obtained from time to time for the enlargement of gas manufacturing plant. The respective particulars of scheduled lands at the Ash Road Works are:

1866	0·943 acres.
1890–1896	2·286 ,,
1901–1910	10·185 ,,
1918–1925	29·679 ,,

The next table gives the quantity of gas manufactured at the stages described:

1866	8,000,000 c.ft.
1890–1896	58,512,000 ,,
1910	317,988,000 ,,
1920	(about) 500,000,000 ,,

The Company have a most up-to-date works, with modern equipment of machinery and plant throughout; and at the present time extensive improvements and developments are in progress to enable them to keep ahead of the growing demands for gas.

THE CEREMONY.

When the party had assembled (under the tarpaulin which weather conditions made very welcome) at the spot where the holder will stand, the Mayor, on the invitation of Mr. Edwards, in a business-like manner cut the first sod.

Mr. EDWARDS said the Directors of the Company had cordially invited the Mayor to initiate, in the presence of the public men of Aldershot and Farnborough, the work of the preparation of the foundations for the new holder, the contract for which had been signed about the middle of November. The construction of the steel work for the holder had been in progress since the date of the contract; and operations at Aldershot would start immediately after the ceremony. The job was a comparatively large one, and had been decided upon after much consideration; for it involved a large financial expenditure. The holder, which would not be available for work until about the middle of 1927, would represent the conclusion of a post-war programme of reconstruction and extensions which had been in hand for some time, and which would, when all were in operation, bring the works into line with the most modern gas-works practice. The hope of the Directors was that the work now being initiated would proceed smoothly, efficiently, and expeditiously. The late Sir George Livesey, a dear old friend of his (who was in his day a leader in the gas industry), in answering on one occasion a cross-examination point in the Committee Rooms at Westminster, to the effect that a gasholder was not a thing of beauty, replied that, in his opinion, a thing of use was a thing of beauty. In conclusion, he remarked that the next largest holder the Company possessed was erected at the Farnborough Gas-Works 23 years ago.

The MAYOR alluded to the remarkable progress that had been made by the Company since the arrival of Mr. Edwards, some twenty or more years ago. The enterprise shown had been matter for admiration by the public men of Aldershot and Farnborough. The area which the Company supplied with both water and gas comprised a large portion of the northern half of Hampshire and parts of Surrey and Berkshire. It was the hope of them all that the energy and ability which Mr. Edwards had displayed over all these years would continue to be rewarded by financial success.

THE HOLDER.

The holder is to be a five-lift standard-guided one in steel tank, or reinforced concrete foundations. The tank will be 160 ft. in diameter and 36 ft. deep, and will have a capacity of 4½ million gallons of water; while the lifts will be 35 ft. deep, and will vary in diameter from 148 ft. to 158 ft. The total height above foundations when fully inflated will be 212 ft. There will be anti-freezers to each cup, and an electrical alarm to indicate when the holder is approaching "full" or "empty." Approximately 3000 tons of steel, cast iron, and reinforced concrete will be required; and there will be about 1,000,000 rivets used in the structure. The lower tiers of tank side plates are to be jointed with double butt covers, and will have an efficiency of 90 p.ct. of the plate strength. The material throughout will not be stressed beyond about one-quarter of its breaking value. All the material used will be of British manufacture. The number of men to be employed on the site is about 140.

The sub-contractors for the foundation work are the F.C. Construction Company, Ltd.

Mr. A. V. Barraclough (the Company's Chief Engineer) is to be congratulated upon such an excellent addition to his resources.

MESSRS. NEWTON, CHAMBERS, & CO.

Messrs. Newton, Chambers, & Co. (the contractors) were making ironwork before gas lighting was in general use, and manufactured some of the first gas-works plant built in the world for James Murdoch. James Malome, Murdoch's chief assistant, was Works Manager at Messrs. Newton, Chambers, & Co.'s Thorncliffe Works for some years at the end of the eighteenth century. The works in those days employed about 20 men, and now, with their subsidiaries, employ 10,000 men, working their own coal, iron ore, and limestone, and making their own coke and pig iron. There are over 30 miles of railway on the works, and the shops cover several acres. The foundries and machine shops have been recently re-modelled, and include some of the largest and most up-to-date machinery for the manufacture of gas-works plant.

The holder now to be built for the Aldershot Gas, Water, and District Lighting Company is the third large holder to be constructed by Messrs. Newton, Chambers, & Co. during the last two years.

A CELEBRATION.

The ceremony over, those who had been present were conveyed in motors to Darracott's Restaurant, where a party of about fifty suitably and adequately celebrated the occasion as the guests of the Chairman of the Aldershot Gas Company and his co-Directors (Messrs. T. A. Braddock, C. P. Crookenden, and B. R. Green). Mr. EDWARDS presided, and submitted the Loyal Toast.

Alderman H. AINGER, J.P., proposed "The Prosperity of Aldershot and District," remarking that such work as had been started that day meant progress and employment, and they all heartily congratulated the Company. He believed this was the first occasion of a

public character on which Aldershot and Farnborough had united; but he hoped it would not be the last.

Responding, the MAYOR said, with a tinge of regret in his tone, that there was a time when the shares of the Company could be bought at one-half their face value; but that was in the early days, when the people had no faith in the future of Aldershot. Since then there had been an amazing change, and a big town had sprung up in one lifetime. He remembered the Gas Company practically from its inception; and it had a remarkable history. Originally there were two Companies, who struggled one with the other; but after the formation of the present Company in 1866 things began to go forward, though there was not displayed that foresight which had characterized the undertaking during more recent years. Since Mr. Edwards's arrival progress had been marked and continuous.

Mr. EDWARDS, replying, said he had been greatly interested in the references of the Mayor to the early history of the undertaking. He had himself lately taken an opportunity of turning-up some of the early volumes of the "GAS JOURNAL" (or the "JOURNAL OF GAS LIGHTING" as it was then named), and had seen recorded there some of the early history of gas in Aldershot. He had been astounded to find recorded there the fact that the employees of the original Aldershot Gas Company and those of the Aldershot Gas Consumers' Company had fights in the public streets. However, things were placed on a better footing when the present Company was formed to take over the two then existing ones, and the Aldershot Water Company. Ever since then extension of business had been the order of the day. The ceremony that had been performed that day by the Mayor was not a final chapter, but one which he believed foreshadowed an entirely new volume. The Directors had in their minds a very considerable extension of operations, the accomplishment of which only required a little patience. Proceeding to welcome the guests, Mr. Edwards said it was peculiarly appropriate that the occasion should be so marked by a gathering of men from the Aldershot Command and the public bodies north and south of that important military centre. There were few places in the Empire so full of significance during war and peace. Aldershot had to be ready for emergencies and equally resourceful in peace time, for then they were compelled to reconstitute and re-capture their ordinary business. From August, 1914, to November, 1918, his Company set aside their ordinary business, and applied all their resources and energies to the interests of the nation. He did not propose to enter on any details; for they did what all true Britishers would do in times of war and emergencies. For five years they fought the backwash of the war under very trying conditions; and now that, fortunately, the corner had been turned, they were fighting the uphill battle with optimism and a cheerful spirit. It would take some time to equate the gas capital expenditure ratio to correspond with the pre-war basis, for this meant doubling the output; but, as business men, they faced their task, and only asked for a fair field and no favour. They would, as in the past, place the interests of the consumer in the forefront, knowing full well that good and efficient service brought the proper reward to co-partners and the shareholders. He asked them to drink to "Our Guests."

Dr. F. BINDLOSS (a member of the Farnborough District Council, whose Chairman was absent through indisposition) replied, and expressed high appreciation of all that Mr. Edwards had done for the area supplied by the Company.

At this stage, a telegram of good wishes sent by Mrs. Edwards from Bournemouth was read by the Secretary of the Company (Mr. F. A. Ricketts).

Mr. T. A. BRADDOCK (Deputy-Chairman of the Company), who explained that he came of a family which for some generations had been connected with the gas industry, proposed "The Contractors"—remarking that for the whole of that time the reputation of the firm of Newton, Chambers, & Co. had stood high. They had already carried out work for the Company, which had always given satisfaction. In a firm like this, of world-wide reputation, the Directors and officials of the Company felt they had contractors upon whom they could place absolute reliance.

Mr. T. V. MILES, J.P. (General Manager of Messrs. Newton, Chambers, & Co.), who responded to the toast, prefaced his remarks by expressing his pleasure at presenting the Mayor, on behalf of the contractors, with an inscribed golden spade, in commemoration of the ceremony he had that day performed. It was an exact copy to scale of the spade which the Mayor had made use of for the occasion. Proceeding, he stated that the firm of Newton, Chambers, & Co. was established in March, 1793, and from very small beginnings had gone on until they were now finding employment for over 10,000 workeople in their various departments. Assuming from four to five in a family they were thus providing for the maintenance of between 40,000 and 50,000 men, women, and children. Messrs. Newton, Chambers, & Co. had successfully erected in almost every quarter of the globe structures of a like character to that they were now to build at Aldershot. They had gained through sheer merit a universal reputation for excellent workmanship.

GAS ACTS FOR 1925.

(*Continued from Vol. 172, p. 845.*)

The STOCKTON-ON-TEES CORPORATION ACT provides for the acquisition by agreement of the undertaking of the Haverton Hill-on-Tees Gas Company, Ltd. The purchase price of the concern (freed from all mortgages, charges, and debts) is £24,155; the stocks to be taken over at a valuation. Balances at the bank and in hand (other than consumers' deposits), rents and profits, and debts due prior to the day of transfer are exempted from the sale. The Act extends the limits within which the Corporation are authorized to supply gas, to include so much of the urban district of Billingham as is not already within those limits and the township of Cowpen Bewley. New clauses since the Bill was drafted include two which relate to Billingham and Cowpen Bewley. If after the expiration of five years from the date of the passing of the Act the Corporation have not laid down reasonably sufficient mains for the supply of gas in Cowpen Bewley the local authority or any other undertaker may apply for powers to provide such a supply. Any question which may arise from time to time as to whether or not "reasonably sufficient mains" have been so laid down shall be referred to the Board of Trade for determination. The Urban District Council of Billingham may within six months after the expiration of seven years or fourteen years from the passing of the Act require the Corporation to sell to them so much of their gas undertaking as is within the urban district of Billingham, upon the terms of paying the fair market value thereof as a going concern, with proper compensation for any loss occasioned by severance. If the Council do not avail themselves of the rights thus conferred upon them, they may within six months after the expiration of eighteen years from the passing of the Act, or within six months after the expiration of every subsequent period of seven years require the Corporation to sell to them such portion of the gas-works and plant of the Corporation as is contained within the urban district of Billingham (except the mains and pipes or other apparatus which shall be necessary for supplying with gas any other part of the limits of the Corporation for the supply of gas) at such price, being a sum in gross, and upon such terms and conditions, as shall be fixed, in default of agreement, by arbitration under the provisions of the Lands Clauses Acts.

A clause that the Corporation may sell or lease any lands vested in or acquired by them under the powers of the gas part of the Act, and not for the time being required for the purposes of the undertaking, has had added to it the words: "Provided that the Corporation shall not without the consent of the Minister of Health sell, lease, exchange, or otherwise dispose of, any such lands or any interests therein at a price or rent or for a consideration of a value less than the current market value of such lands or interests." Provisions have also been added as to the disposal of capital moneys so received. A clause to empower the Corporation to acquire by agreement lands additional to those specified has been deleted. There is authorization of differential prices in part of Billingham (2d. per therm) and the parish of Cowpen Bewley (o·8d. per therm). At periods of seven years from the passing of the Act, the Billingham Urban District Council may apply for revision of the differential price in their area. The same right applies to the Corporation at seven years' intervals, after the lapse of the first fourteen years. The agreed clause for relief from obligation to supply is included. Power is given the Corporation to purchase by agreement the mains and apparatus within the extended limits of any persons supplying gas in any part of such limits; and, for the protection of Messrs. Dorman, Long, & Co., the stipulation has been added that the Corporation shall not supply gas in the part of the urban district of Billingham now supplied by that firm until the Corporation have exercised this power. The exact wording of the final part of this provision (which was the subject of a long discussion in the Committee Room) is: "Until the Corporation shall, in exercise of the power conferred upon them by the last preceding section of this Act, have purchased the gas mains, pipes, and apparatus of the Company, or such of those mains and pipes and so much of that apparatus as the Company may desire to sell, and have also purchased the goodwill (if any) attaching to the supplies of gas given by the Company in that area or paid compensation to the Company for loss (if any) through ceasing to give such supplies." From the passing of the Act the township of Stainton ceases to form part of the gas limits of the Corporation. Authority is given to the Corporation to supply power gas. Lengthy protecting clauses in connection with roads, bridges, &c., have been inserted. For repayment of the purchase price of the Haverton Hill-on-Tees Gas-Works, a period of forty years is allowed from the date or dates of borrowing; and for other mains, pipes, and apparatus, thirty years. [*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

The UCKFIELD GAS AND ELECTRICITY ACT incorporates and confers powers upon the Uckfield Gas and Electricity Company. It is set forth in the preamble that the Uckfield Gas Company, Ltd., were in 1858 incorporated under the Joint Stock Companies Act, without any restrictions as to dividend. Growing demands for gas, and the feeling that a supply of electricity

would be of advantage to the public, led to the promotion of the Bill. It was originally proposed that the incorporation should date from Oct. 1 last; but in the Act this is altered to Jan. 1, 1926. The capital is fixed at £40,000, of which £10,800 is to be substituted for the existing share capital and £29,200 may be raised in the manner prescribed by the Act. The former amount is to be divided among existing proprietors in the proportion of £6 of stock for each £5 share held by them. The additional capital may be raised as gas or electricity ordinary or preference stock; but no greater nominal amount may be raised than is sufficient to produce, including premiums, £29,200. Borrowing powers are granted up to one-half of the issued capital. Money raised for the purposes of the gas undertaking or the electricity undertaking, as the case may be, including premiums, is to be applied only to the undertaking in respect of which it has been raised. Separate accounts of capital expenditure and revenue are to be kept in respect of gas and electricity undertakings. The interest on gas preference capital is not to exceed 6 p.ct.; and the standard rate of dividend on the ordinary gas capital is fixed at 7 p.ct. on the amount paid up. Surplus gas profits up to a total of one year's dividends (including borrowed money) may be carried forward. The limits of supply are scheduled; and a sub-section has been added since the drafting of the Bill to the effect that: "Within three months after the passing of this Act, the Company shall deposit at the office of the Electricity Commissioners an Ordnance map, on a scale of not less than 1 in. to the mile, with the limits for the supply of electricity by the Company marked thereon." Lengthy clauses have been inserted for the protection of the East Sussex County Council, the Uckfield Urban District Council, and the Southern Railway Company. The standard price for gas is 1s. 6d. per therm; the ordinary capital being subject to a sliding-scale of ¼ p.ct. in respect of each one-fifth of a penny above or below this price.

Various clauses besides the one above referred to have been added to the original measure, including the agreed one as to relief from obligation to supply. Another provides that if after the expiration of five years from the passing of the Act the Company have not laid down mains for the supply of gas in any of the rural parishes or parts of parishes scheduled, the local authority concerned, or any company or person, may apply for an Act or Special Order for the purpose of providing such a supply and for the repeal of the powers of the Company in that respect. In the case of the electricity undertaking, the Minister of Transport may, at the expiration of three years, revoke the powers in respect of the whole or part of any rural parish in which distributing cables shall not have been laid. The standby charge has been altered from the maximum of 25s. a quarter proposed, to such an annual sum as will give a reasonable return on capital expenditure and cover standing charges involved in being prepared to meet the possible maximum demand. In the electricity portion of the Act, clauses have been inserted for the protection of the East Sussex County Council and the Conservators of Ashdown Forest. In the Bill as deposited, provision was made for the partial repeal of the powers of the Crowborough District Gas Company for the supply of gas and electricity, and of the Lewes Gas Company in respect of the supply of gas in certain areas; but the provision for the repeal of powers of the latter Company does not appear in the Act. The area of supply of gas and electricity by the Uckfield Company has been slightly modified. [*Parliamentary Agents: Messrs. Torr, Durnford, & Co.*]

AMERICAN GAS ASSOCIATION.

REPORTS AND PAPERS REVIEWED.

Fourth Article.

CHRISMAN DOWN-RUN PROCESS.

In the Chrisman down-run method for water gas generators, the down-run gases are taken from the base of the generator direct to the wash box. Hence, no heat is removed from the carburettor or superheater by the reheating of these gases, and, of course, it is not necessary to replace that which has not been removed. It is therefore possible to bring the temperature of these vessels up to the proper working point with a shorter blowing period. Experience has shown that, with the usual fuels, a saving of from 2 to 3 lbs. per 1000 c.ft. of carburetted water gas made over the ordinary method of operating can be secured by the adoption of the Chrisman down run. Since the process produces no change whatever in the conditions in the carburettor and superheater, the saving in the generator fuel required per 1000 c.ft. of gas made is obtained without loss of oil efficiency. Speaking very generally, it can be said that a plant having combination blast gas and illuminating gas waste-heat boilers can, by the installation of the Chrisman down-run process, effect a saving in cost of fuel of from 60 to 75 p.ct. of the saving possible to plants not so equipped.

Detailing results at Reading (Pa.), Mr. L. W. Seltzer, Engineer of the Reading Consumers' Gas Company, said it is a well-known fact that the gases made on the down run leave the generator at a very much lower temperature than either the blast or the up-run gases, and that this temperature is far below that required in the carburettor and superheater for efficient oil results. Having these comparatively cool gases bypassing the carburettor and superheater prevents the unnecessary abstraction of heat from the checker brick; and with this cooling effect reduced, the correct temperature for proper oil fixing can be maintained with a decreased fuel consumption. For the purpose of properly carburetting the gas, it becomes necessary, with this process, to use oil only during the up run. His Company have for several months been using this method of gas making, with satisfactory results—that is to say, with the saving in generator fuel already referred to. The fuel used in this case is beehive oven coke; but with anthracite, other cokes, or even a mixture of bituminous coal with either, a similar saving might be expected.

BITUMINOUS COAL IN WATER GAS APPARATUS.

In an article dealing with recent developments in gas equipment by the U.G.I. Contracting Company, Mr. C. J. O'Donnell stated that during the past year considerable work has been done in connection with the use of bituminous coal in water gas apparatus, which has been responsible for various suggestions in order to handle this fuel successfully. Some of these improvements will be incorporated in an uncarburetted water gas plant at Belle (West Virginia)—the first installation in the country designed for the production of blue water gas with the use solely of bituminous coal. Each of the four sets is fitted for the Chrisman down-run process just referred to, and the Pier process, mention of which was made in the instalment of this review which appeared in last week's "JOURNAL." Past experiences, said Mr. O'Donnell, have shown that it is impossible to handle 100 p.ct. soft coal in generators of the size installed here (which are 11 ft. sets) without the use of this "Pier," the object of which is to increase the wall area of the generator.

USE OF GAS MASKS.

Accident prevention has become a definite branch of activity of the American Gas Association; and the Committee having charge of this matter had much practical information to impart. In this section of the report the Sub-Committee on Safety and First Aid Devices emphasized the importance of the use of gas masks. There is, they said, only one way to guard against carbon monoxide when it is necessary to work in an atmosphere which has become diffused with gas, and that is by using an approved type of gas mask. The mask should be worn not only in repairing high-pressure mains where large volumes of gas are escaping, but also by gasfitters and men working in other places where the concentration may not be high, but where continued exposure might result in impaired health, and possibly more serious consequences. The employer must insist on the employee wearing the mask when the occasion warrants. The use of a gas mask is not a hardship, as the approved hose type masks are not uncomfortable to wear. These masks are provided with several lengths of hose, through which fresh air is forced by means of a blower; and there is no breathing resistance to overcome.

AUTOMATIC TEMPERATURE CONTROL.

Before the Industrial Gas Section, Mr. A. A. Pihlman, of the Consolidated Gas Company of New York, read a paper in which he expressed the opinion that there is evidence to show that industry is impatient with the laxity of gas men in controlling properly the temperature of gas heated appliances. To cite a concrete case, in a city in which the gas service had never been interrupted since its institution, and in which the electrical service was subject to occasional interruptions due to storms, a newspaper organization had changed the heating medium for the metal pots of half of their type-casting machines from gas to electricity. This action was taken to eliminate a delay of one-half hour each day due to excessive temperature changes caused by fluctuation of the gas service pressure with variation in the load. Each underheated or overheated pot made one operator and a $4500 machine idle until the correct metal temperature was attained. The only reason that all of the pots had not been converted to electrical heating was that the electric service was subject to the occasional interruptions to which he had referred. Installation of a good thermostat on each gas heated pot improved the operation of those units. As a result of this improvement, the order for an additional electric machine which had been given to the manufacturer, but of which shipment had not been made, was changed from an electrically heated machine to a gas heated one. This is a typical case in which thermostatic control paid for itself within eight months.

THE PEOPLE'S GAS LIGHT AND COKE COMPANY.

Seventy-Five Years of Gas in Chicago.

An interesting history of the origin and growth of the gas industry in Chicago, together with an account of the various gas companies now consolidated into one organization, has been written by Wallace Rice and published by the People's Gas Light and Coke Company.

It was in October, 1848, that a group of men prominent in Chicago made the necessary application to the Illinois legislature in order to begin the manufacture of gas for the city, and in 1849 the Chicago Gas Light and Coke Company came into being. Its capital stock was fixed at $300,000 in shares of $25 each. Consumers to the number of 125 were secured, in addition to 99 street lamps and the illumination of the city's one public building. Manufacture of gas began in August, 1850, only one of the furnaces being fired. The consumption at the start averaged 15,000 c.ft. a night, of which 11,800 c.ft. was for private use. In October of the same year it was found necessary to use the second furnace, increasing the output to 22,000 c.ft. for the 24 hours. Ready markets were found for coke and tar, which went a good way in paying for the coal; and on May 13, 1851, a semi-annual dividend of 5⅓ p.ct. was declared. During the first ten years of its existence, the Company increased the mileage of its mains from 5 to 53—or more than 1000 p.ct.—and the number of its customers from 125 to more than 2000—or over 1600 p.ct.

DIVISION.

In 1855 a Bill was signed creating the People's Gas Light and Coke Company, and in 1862 the Company began the manufacture and distribution of gas. Its early history is an account of difficulties overcome—not the least important being the period of the Civil War, when the price of all materials increased, coal costing $13 a ton, and when an impost of 25c. per 1000 c.ft.. of gas sold was enforced.

The Chicago Company, until the great fire of 1871, was fortunate in having no history. By that year it had 135 miles of mains, and the demand for gas was increasing rapidly.

Beginning on Oct. 9, 1871, a fire devastated Chicago, burning over 1688 acres, and destroying a third of the property in the town, valued at 186 million dollars, including 18,000 buildings which had housed 100,000 people. This event was naturally a set-back to both Companies, though it did not destroy all their manufacturing stations; one works of the People's Company being untouched. In 1881, as a result of much reconstruction work, the Chicago Company had more than 200 miles of supply pipes in use. By this time the People's Company was also showing an increase in the volume of its business.

Other manufacturers of gas were soon in the field. The first of these was the Hyde Park Gas Company, which was incorporated in 1871. The Pullman Gas Company came into being in 1880; the entire plant of this Company being acquired by the People's Company in 1899. A similar fate eventually overtook the plant of the Hyde Park Company. In 1881 the Lake Gas Company was incorporated, and in 1884 the Suburban Gas Company—a subsidiary of the Chicago Gas Light and Coke Company—was formed, being sold to the latter Company in 1889.

With the passing of the year 1881, the period of divided areas without competition also passes, to be followed by sixteen years of intense competition before the need for consolidation became a necessity as apparent as it was absolute, if justice was to prevail, whether to stockholder, bondholder, consumer, or municipality.

COMPETITION.

Active competition was ushered in by the organization of the Consumers' Gas Fuel and Light Company in 1881. In 1886 the Consumers' Gas Company came into being, and bought the former Company. The Equitable Gas Light and Fuel Company was incorporated in 1885, to be followed in the same year by the Illinois Light, Heat, and Power Company. The spirit of competition entered the Chicago Company, and in 1886 it secured permission to invade the People's Company's preserves.

CONSOLIDATION FRUSTRATED.

The Chicago Gas Trust Company was organized in 1887, to put the gas business in Chicago under consolidated control. At the beginning of that year the various companies particularized were functioning as such, but were controlled by four—the Chicago, the People's, the Consumers', and the Equitable. The Gas Trust bought the controlling interest in these four, and proceeded to handle the situation under a trust agreement. This attempt at a general consolidation was the beginning of complicated litigation that ran on for nearly ten years. One after another the courts nullified every expedient that lawyers could devise under then existing statutes for effecting consolidation. At the back of all this litigation was the implied belief that consolidation was essentially an evil. The whole question—solely one of economics, and therefore of demonstrable proof—was thrown into partisan politics, which took it from the realm of science and reason into the misty borderland of prejudice and emotion. Just as the old competition had resulted, and was resulting, in duplicated and wasteful efforts to be borne ultimately by the consumer, so the emotional and spasmodic attempts to cheapen the price of gas, without a careful weighing of every factor entering into its manufacture, resulted in wasted legal proceedings, again at the expense of the community.

In 1885 came the Calumet Gas Company; and another concern, the Mutual Fuel Gas Company, was incorporated in 1889. For the more complete entanglement of Chicago's gas affairs, the Chicago Economic Fuel Gas Company was launched in 1890. The last, and one of the most energetic, of the competing concerns was the Ogden Gas Company, organized in 1895.

CONSOLIDATION.

In the year 1897 an "Act in Relation to Gas Companies" was passed. By its provisions, any gas company was authorized to sell its property and franchises at will to another gas company in the same city, and any company was permitted to merge and consolidate with another into a single corporation. Under this Act, the People's Gas Light and Coke Company, in 1897, took into its organization its senior, the Chicago Gas Light and Coke Company. One by one the other companies were acquired by the People's Company, until in 1913 the final feat of consolidation was effected.

The People's Gas Company was required by ordinance to supply gas of 22 C.P., to deliver which much gas oil had to be used for enrichment. Meanwhile the importance of this illuminating value had been declining, and had by 1913 become almost negligible; the heating value being the important consideration. In that year the Illinois legislature passed a law creating a State Public Utilities Commission, since 1921 called the Illinois Commerce Commission. This body was given regulatory authority over all public utilities of the State. It was not, however, till 1917 that Chicago assented to withdraw opposition to elimination of the candle-power standard and to a modernized sliding-scale of rates.

Important operating economies were effected in 1918 and subsequent years. A site for a coal gas plant was acquired, and the Chicago By-Product Company (a subsidiary of the Koppers Company) financed and built a combination coal gas and water gas plant, which was put into operation in 1921, and has since been added to. This plant represents an investment of $28,000,000, exclusive of the land. Eventually it is to be the property of the People's Company, which has the right to take it over any time after Feb. 1.

As a consequence of this regenerative work, the Company was able to resume, in January, 1922, the payment of quarterly dividends for the first time since August, 1917. Dividends have continued at the rate of 5 p.ct. per annum in 1922, 6 p.ct. in 1923, 7 p.ct. in 1924, and 8 p.ct. in 1925. The price of gas has been reduced twice since 1920. In 1924, 31,621 million c.ft. of gas was sold by the Company.

The Company has had service annuities in effect for many years, by which pensions running from $25 to $50 a month were granted for disability through superannuation or otherwise. In June, 1912, the system since in effect was adopted. The amount of the annuity is arrived at by averaging the salary or wage received during the last five years of work, and multiplying 2 p.ct. of this by the number of years employed; the minimum being $25 and the maximum $500 a month. In December, 1921, a comprehensive plan of gift insurance was adopted. Under it, those who have been in the service of the Company more than six months, but less than a year, are given a minimum policy for $500, and so on year by year until a maximum of $1500 is reached on and after six years. At the close of 1924 there were 3839 employees in every grade thus provided for to the total amount of $4,204,500. Systematic saving and investment are definitely cultivated, for which there is a Savings and Investment Fund. In the current fund, employees of the Company have accumulations amounting to approximately $1,500,000. A considerable number of the employees have become stockholders in the Company during the few years since inauguration of the policy of interesting the public in general, and the employees in particular, in becoming owners of the stock. On Jan. 1, 1925, the Company was owned by 9452 stockholders, of whom 5880 lived in Chicago, and 6817 in Illinois.

Thirty Useful Equivalent Tables.—From the Central Translations Institute, Ltd., of 808, Salisbury House, London Wall, E.C. 2, we have received a copy of these conversion tables. They deal with linear, square, and cubic measure. Incorporation of tables relating to temperature and heat would, we suggest, add considerably to the practical utility of this already useful compilation.

GAS ESCAPE AT NEW BRIDGE STREET, BLACKFRIARS.

Sunday, Nov. 15.

[Reprinted from the January issue of the "Co-Partners' Magazine" of the Gas Light and Coke Company.]

The accompanying photographs show the use of gas masks in the final stages of the location of a recent escape of gas at New Bridge Street. The mask shown is that in general use in the distribution department, and consists of a rubber-covered breathing piece, which fits over the nose and mouth and is held in position by straps attached to a cap. The air inhaled is drawn through a length of hose, the end of which is taken upwind of the escape, and the exhaled air passes out through a valve fixed on the side of the breathing piece.

In common with many of the main roads in the City and West-End, New Bridge Street is paved with wood blocks laid on about 12 in. of concrete. This surface being impervious to gas, any leakage of gas accumulates in the subsoil. The fact that the subsoil is generally loose, owing to the many times that it has been excavated and replaced in the laying of underground plant, renders it practically useless to put in searcher holes with the object of locating the escape, as indications of gas may be obtained anywhere over a considerable area round the actual defect.

A further difficulty arises from the fact that electric and telephone cables are frequently laid in ducts or pipes with open joints, and the gas, getting into these ducts, finds its way along the whole system, filling up the jointing boxes and manholes *en route*. In the case of a small escape it frequently happens that when gas has been reported in a jointing box, the defect in the main is found to be 200 yards or more away, the gas having travelled through the cable ducts.

The first step in dealing with a serious escape is to have the covers of the boxes and pits removed, to allow the gas to get away, and then the ground must be opened to ventilate the subsoil. It is only after this has been done that there is any chance

of finding from which direction the gas is coming. Of course, if there are only one or two mains in the street, the problem is simplified; but in the case of New Bridge Street, at its junction with Tudor Street, there are no less than nine mains belonging to this Company, including three 36-in. and two 30-in. mains.

Some of the mains are high-pressure ones from Beckton, feeding the various governor houses in the West-End of London, and others are low-pressure district mains from the Tudor Street governor house. This governor house is on the northern extremity of the site of the old City of London Blackfriars Works.

These considerations will help to explain why it took eighty-four hours' continuous work to find the split in the 30-in. main which was the cause of the trouble.

One of the bands which were fixed temporarily to secure the main will be seen in the second photograph.

INSTITUTION OF GAS ENGINEERS' EDUCATION SCHEME.

Conference with Teachers.

The Education Scheme of the Institution having now been in operation for over two years, and several questions of a general character having emerged upon which it appeared advisable to elicit the counsel and advice of those engaged in giving tuition in Gas Engineering and Gas Supply in the various technical institutes throughout the country, a Conference of Teachers, the Board of Examiners, and the Consultative and the Advisory Committees was recently held in the board-room of the Institution, Grosvenor Gardens. Altogether over seventy invitations were issued, and the actual attendance was fifty, of whom more than thirty were teachers.

After a hearty welcome to all attending the Conference had been given by the Chairman of the Advisory Committee (Mr. F. W. Goodenough), who thought it a happy augury for the success and development of the Education Scheme that so many representatives of the various interests concerned should meet in consultation, each to put his own contribution into the common stock, the Chairman of the Board of Examiners (Mr. H. D. Madden) outlined the standards which they were desirous of setting-up, and the weaknesses in the work of the candidates as revealed in the two past examinations.

The principal matters discussed, however, ranged round the question of obtaining greater uniformity in the internal examinations for the Ordinary Grade Certificates in Gas Engineering and Gas Supply. It was considered that when the time allowed for the examinations varied by so much as from 2½ to 4 hours; where the number of questions set varied from 8 to 16; and where the questions themselves are set by individual teachers without consultation with, or reference to, any others except the Assessors appointed by the Institution, the difficulty of obtaining a comparative and reasonably uniform standard was sure to be felt.

With a view to elucidating these and other cognate matters, a very full, frank, and friendly discussion took place, participated in by about twenty representatives from such widely separated areas as Bristol and Bradford, Birmingham and Bournemouth, Cardiff and Halifax, Leeds and London, Manchester, Motherwell, and Glasgow. It was the common verdict that the Conference had been extremely useful and, indeed, inspiring—so much so that it was unanimously agreed to make it an annual event.

At the close the members were entertained at luncheon at the Belgravia Hotel by the kind invitation of the Chairman of the Advisory Committee (Mr. F. W. Goodenough), where Prof. Smithells (who was present as an interested guest), in proposing the health of the Chairman, outlined a few ideals in teaching which he promised to amplify and commit to paper for the consideration of those attending the Conference and of those prevented from doing so. A short speech from Mr. A. Abbott, of the Board of Education, in seconding, and suitable acknowledgments from the Chairman, brought to a close a very profitable Conference, which all who attended felt had not only been extremely useful in serving its own definite purpose, but had given the whole Education Scheme a great impetus.

"F.E." Dryers for Coal and Coke.

Of considerable interest is the "F.E." vertical gravity dryer, which is constructed in several forms for dealing with small coal for carbonizing, briquetting, or pulverizing, coke breeze, &c. The operation of this apparatus is simple. The material to be dried is delivered into a hopper or hoppers at the top of the dryer, and gravitates through hollow walls. A discharge device at the base—which takes the form of a rotary valve, horizontal table, or oscillating plate, depending on the size of the dryer and the conditions under which it is called upon to operate—keeps the material in motion, and varies the rate of passage. The drying medium can be the flue gases from a boiler or retort setting, or an independent furnace may be provided. The hot gases are drawn through the material by fan suction; a large drying area thus being available. The advantages claimed for the plant are numerous. First of all there is efficiency. The hot gases for drying must pass through the walls of material; and therefore the heat radiation losses are small. Then there is the question of space occupied, which is small for the duty. No power is required except for the discharge device and the fan; and the temperature at which the drying is effected can be readily controlled. These dryers are constructed with one, two, or more walls; the design depending on the quantity and the character of the material to be dealt with, and the amount of moisture to be removed. A moisture reduction from 20 p.ct., or more, to as low as 2 p.ct., it is claimed, can be effected; and the dryers can be made in single units of from 1 ton hourly capacity to 25 tons, or more. The sole licensors for manufacture, sale, and use are Fuel Engineering, Ltd., Parliament Mansions, Victoria Street, S.W.

"Flame Doors" for Furnaces.—A plan which is found very convenient in forging, and which is referred to by Mr. R. G. Guthrie in the "American Gas Association Monthly," has been adopted by the People's Gas Light and Coke Company of Chicago. This consists in the removal of the furnace door and the substitution for it of a ribbon burner at the foot of the entrance, which casts a large yellow flame up past the opening, thereby excluding the air. This enables the operator to see through the flame just what is going on in the furnace. He can also reach right through this curtain of flame with his tongs, and insert or remove the parts as they are ready. This obviates the necessity of having to raise and lower a door, and is much more air-tight than any door could possibly be. Mr. Guthrie states that very little heat is lost through this "flame door."

Paint for Chemical Works.

Dealing, in "Chemistry and Industry," with the subject of corrosion in the works, Mr. Cecil O. Harvey, B.Sc., A.R.C.S., said that the "rusting" of iron and steel has attracted the attention of many investigators; and though valuable contributions to the solution of the problem have been made, up to the present these cannot be said to have greatly assisted the works chemist and chemical engineer. For all-round general utility and efficiency in the chemical works, a good bituminous paint will be found to give satisfaction; and in deciding whether such a paint is good or bad, it is a mistake to be guided purely by considerations of cost and bitumen content. Bituminous paints containing an appreciable proportion of coal tar are less costly than those containing drying oils or purely "bituminous substances." Yet, provided the tar has received adequate chemical treatment, the tar paint is often found to give greater satisfaction than its more expensive competitor. An excellent paint may be made quite cheaply by treating coal tar with 10 p.ct. of lime, gradually raising the temperature to 200° C., maintaining this temperature for 15 minutes or so, and adding 4 lbs. per gallon (of tar) of a hard bitumen, such as gilsonite. Heating is continued until the mixture is homogeneous; and, after cooling to a temperature of about 90° C., crude benzole is gradually stirred-in, in the proportion of about one volume of benzole to two volumes of the molten mixture. The paint should be allowed to cool in an air-tight vessel. Variations in quality can be avoided by using only coal tars having specific gravities within the range 1·15 to 1·20.

National Lime Association.—A bulletin on "Water Softening" is the most recent publication of the National Lime Association, of 918, G. Street, N.W., Washington, D.C. The four main chapters treat the subject as far as possible in a non-technical manner, and afford a good deal of useful information. Each of the chapters refers to a particular phase of water softening. The first, on "Advantages of the Use of Lime in Water Treatment," is by Mr. C. P. Hoover, of Columbus, Ohio. The second discusses "The Cost of Impurities in Locomotive Water Supply, and the Value of Water Treatment," and is from the report of the Water Service Committee of the American Railway Engineering Association. The third chapter, on "Raw Water Ice," presents many facts in an interesting style. Mr. C. Arthur Brown prepared the last chapter, entitled "Some Variants from Accepted Formulæ in Water Flows," and has clearly explained and simplified a number of the mathematical formulæ commonly used by water-works superintendents and operators. The bulletin will be sent free.

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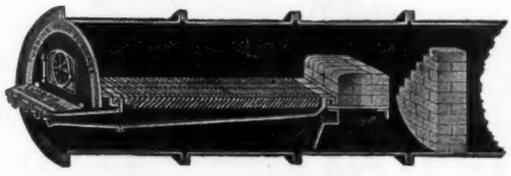

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URASTONE.

In a recent paper

by the Chief Supt. of the Fittings branch of the Birmingham Gas Dept., mention is deservedly made of the efficiency, comfort, cleanliness, convenience and hygiene of modern Gas Appliances, and of Asbestos-cement flue pipes' contribution to these results.

But Remember

the name URASTONE as distinct from just any Asbestos-cement pipe. Urastone is a FLUE PIPE, has **always** been made specially for the industry and is the pipe regularly employed by the Birmingham, Gas Light & Coke, Tottenham, Brentford, Croydon, and most of the other leading undertakings. Don't pay mere ha'pence less and mar the good looks of a handsome gas appliance by fitting — just any Asbestos-cement pipe; ***Use Urastone.***

CELLACTITE WORKS LTD.

London Offices: 67, QUEEN VICTORIA STREET, E.C. 4.

Telephone: Central 6978. Telegrams: "Cellactite, Cent. London."

FACTORIES: HIGHAM, KENT.

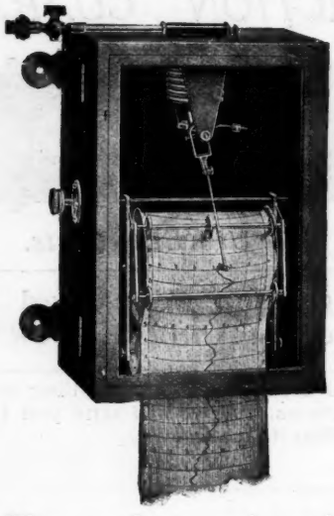
Telephone: Gravesend 593. Telegrams: "Cellactite, Gravesend."

SIMMANCE'S DEAD BEAT RECORDER

TAPE CHART PATTERN

For Pressure or Vacuum.

NO LIQUIDS USED.



The chart roll is renewed 6 times a year.

The record can be torn off at any interval.

Lowest Range :
0-2 inches water.

Highest Range :
0-300 lbs. per sq. inch.

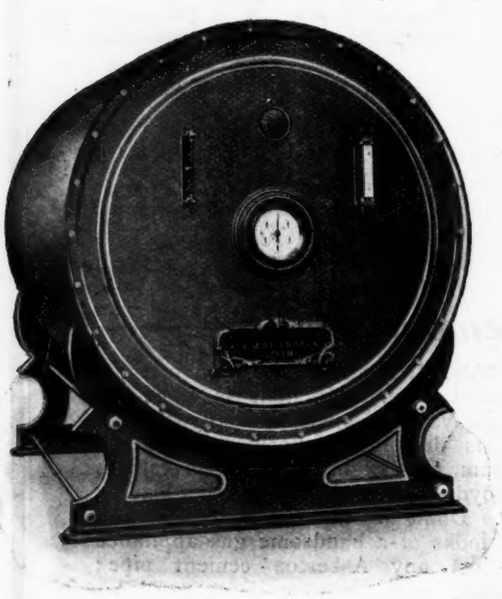
Suitable for Gas, Air, Water, or Steam, and may be used on Crude Gas.

Sole Licensees :

ALEXANDER WRIGHT & Co., Ltd., WESTMINSTER

TELEGRAMS: PRECISION VIC. TELEPHONE: VICTORIA 1207.

Braddock's Gas Station Meters



No. 245.—BRADDOCK'S 1500 LTS. WET METER.

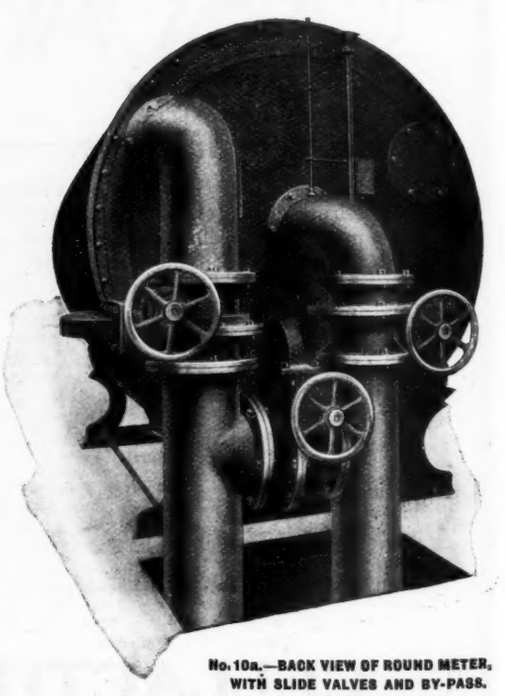
In Cylindrical Cases, for from 500 to 30,000 cubic ft. per hour.

The Best in the Market.

Dimensions and Full Particulars upon application.

OF SUPERIOR QUALITY AND CONSTRUCTION.

May be seen working up to full capacity before delivery.



No. 10a.—BACK VIEW OF ROUND METER, WITH SLIDE VALVES AND BY-PASS.

J. & J. BRADDOCK, GLOBE METER WORKS, **OLDHAM**

(BRANCH OF METERS LIMITED). Telegrams: "BRADDOCK OLDHAM." Telephone No. 815.

AND **45 & 47, Westminster Bridge Road, LONDON, S.E.**

Telegrams: "METRIQUE LAMB LONDON." Telephone: No. 2412 HOP

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Suction Regulator for Turbo-Exhausters.

SIR,—We were interested to read the account in your current issue of the so-called "B.T.H. Regulator." The illustration and description are accurate in every detail, and the plans for sensitive control are correct; but we should like to point out that this is the "Waller" steam governor, of which we are the sole makers.

We have supplied over 500 of these governors, not only in conjunction with our own turbo and four-blade exhausters, but also for exhausters by other makers.

Your contributor was evidently misled by seeing the governor operating on some other make of machine.

GEORGE WALLER & SON, LTD.

Phœnix Iron-Works,
Stroud, Glos., Jan. 4, 1926.

Institution of Gas Engineers Education Scheme.

SIR,—May I through the medium of your columns remind all those who wish to sit for the 1926 examinations in Gas Engineering and Gas Supply as external students under section 2 of the Education Scheme of the Institution of Gas Engineers, and also all candidates for the Diplomas of the Institution, that their applications must be forwarded to the undersigned not later than the last day of February next.

The examinations in both Gas Engineering and Gas Supply will be held on Saturday, May 1.

WALTER HOLE, Organizing Secretary.

"Wharfedale,"
Barton, Torquay,
Dec. 31, 1925.

REGISTER OF PATENTS.

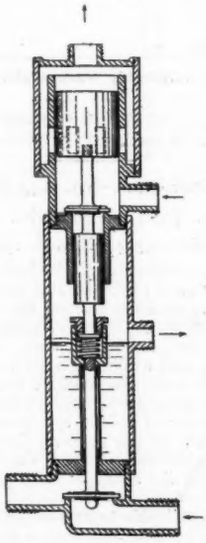
Water and Gas Supply Valves of Water Heaters. No. 243,261.

EWART, J. H., of Crouch End, N. 8.

No. 15,372; June 13, 1925.

This invention relates to water and gas supply valves of geysers, wherein a piston or float-valve controlled by the water supply, and connected directly to a poppet-valve controlling the supply of gas, is automatically opened against the action of gravity by the flow due to the turning-on of the water. With such fittings it is found that when the water supply is turned off, there is a tendency for the piston-valve to remain open owing to the water imprisoned below it, which can only escape by leakage. The object of this invention is to obviate this disadvantage.

To this end there is provided a valve in connection with the piston or float-valve, designed to be closed when the piston-valve is in the normal or closed position, and to be opened by the opening of the piston-valve to allow a leakage of water and quick descent of the said piston valve when the water supply is cut off.



Improved Automatic Valve for Geysers—J. H. Ewart.

In a suitable arrangement, a drawing of which we reproduce, the leakage valve is formed on, or carried by, the spindle which connects the piston-valve to the gas-valve; the spindle being formed below the leakage valve with a cylindrical or piston enlargement loosely fitting within a downward extension of the seat of the leakage valve. In order that the leakage and the gas valves may be effectually seated in the closed position, the connecting spindle is formed in two parts with a spring between them; the two parts having co-acting shoulders for positively effecting the opening of the gas-valve, the shoulders moving out of contact to allow independent seating of the valves.

The piston valve may be formed with a vent hole, so that in the event of the supply of water failing and air entering below the valve, it will be vented when the water is again turned on.

Coking of Coal.—No. 243,414.

RUSHEN, P. C., of Southampton Buildings, W.C. 2. (A communication from the KOPPERS COMPANY, of Pittsburg.)

No. 18,242; July 30, 1924.

The invention has for its objects to provide a method of coking coal with steaming, and also a corresponding coke oven structure, which will provide a maximum yield of blue gas and at the same time ensure uniform and rapid coking of the charge.

The claims comprise applying extraneously developed heat to a mass of coal having the lower part thinner than the upper part, and when the coking of the thinner part of the mass is practically completed, introducing steam into the thinner part; and also combining, with coking chambers of downwardly tapering cross-section, steam inlets debouching into the lower, narrow part of the chambers.

The invention is described and illustrated as applied to a horizontal chamber coke-oven battery (of the Becker type) whereof the chambers taper in width from top to bottom, with the result that the coking operation in the lower region is completed in advance of that in the upper region of the retort, and the lower part of the charge is in condition for being steamed in the early part of the coking interval.

Thus, it is pointed out, a maximum yield of blue gas will be obtained. Narrowing the lower part of the coal charge not only shortens the coking time, but shortens it proportionately more than the narrowing reduces the charge, because narrowing the charge increases the average coking rate. This condition is augmented by increasing the width of the flame flues to provide proportionately more heat to the narrower coke charge. Moreover, although the lower portion of each charge is done in advance of the upper portion, overheating of the lower portion of the charge will be avoided on account of the steam which is introduced into the lower portion of the charge and keeps its temperature below that which tends to cause destruction of the coke. The invention therefore combines extremely rapid coking with a maximum production of gas, and yet avoids any overcoking.

Lids for Retort Mouthpieces.—No. 243,525.

BURTON, A. E., of New Barking.

No. 28,266; Nov. 25, 1924.

This invention relates to lids for the mouthpieces of gas retorts, and particularly to the means employed for sealing and tightening such lids, which has usually been effected by a lever acting on an eccentric in the hinge of the crossbar which carries the lid.

According to this invention, the connection of the crossbar with the lid comprises an eccentric which can be actuated by a lever located approximately at the centre of the lid, and the hinge is provided with an eccentric for compensating wear. The lever may, for example, have an eccentrically bored boss entering a circular recess in a rib or web on the lid, through which boss passes a pin on the crossbar, so that by turning the lever towards the hinge, after the crossbar has been secured in the closed position by a catch on the mouthpiece in the usual manner, the lid is pressed towards the mouthpiece. Thus when the lid is opened, the lever is swung clear away from the mouthpiece, and difficulties in the operation of the catch arising from the position of the lever on the hinge are avoided.

Distillation of Carbonaceous Materials.—No. 243,857.

LAING, B., of Hatfield, and NIELSEN, H., of Muswell Hill.

No. 24,048; Oct. 10, 1924.

This invention relates to methods of distilling carbonaceous materials such as coal, shale, lignite, peat, wood, organic bodies, sewage, sludge, and similar materials at low or medium temperatures, in which rotary retorts on the patentees' well-known principle are employed. In such methods it is pointed out that the most important factors governing efficiency are (1) the temperature range at which the operation is carried on, (2) the time period during which the material is subjected to certain temperature ranges, and (3) the prevailing atmosphere inside the retort during the heating operation.

Owing to the existence of wide divergences in the constitution and characteristics of different carbonaceous materials, a treatment which produces the maximum yield of the desired products or bye-products from one material may be totally inadequate with another. Consequently, and unless the governing factors mentioned above can be adjusted in advance, and preferably independently of one another, to meet any desired requirement, the operation cannot successfully and economically be applied to the treatment of different materials.

According to the present invention, the necessary control is ob-

tained by providing means for admitting the inert or relatively inert heating medium to different points of the interior of the retort, and in varying as required the amount of heat supplied to any particular zone of the retort during any time period, so as to create a suitable temperature at the particular point in the retort where this is necessary, either temporarily or permanently.

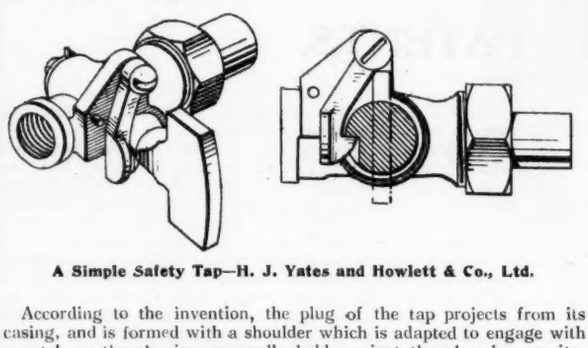
This is accomplished by providing a series of valves along the retort, the construction of which, together with the necessary modifications of the retort, are fully described and illustrated in the specification. The latter details, *inter alia*, the special applicability of the invention to the problem of dealing with strongly caking or swelling coals.

Taps or Valves.—No. 243,847.

YATES, H. J., HOWLETT, M., & CO., LTD., and DOLPHIN, J., all of Birmingham.

No. 23,520; Oct. 6, 1924.

This invention relates to taps or valves having a device for locking the tap when in its "off" position. The object is to provide a tap of this type wherein the catch is of simple construction and the whole may be operated with one hand.



A Simple Safety Tap—H. J. Yates and Howlett & Co., Ltd.

According to the invention, the plug of the tap projects from its casing, and is formed with a shoulder which is adapted to engage with a catch or thumb piece normally held against the plug by gravity, this catch piece being pivotally connected to the casing. The arrangement is clearly shown in the perspective and the side view which we reproduce.

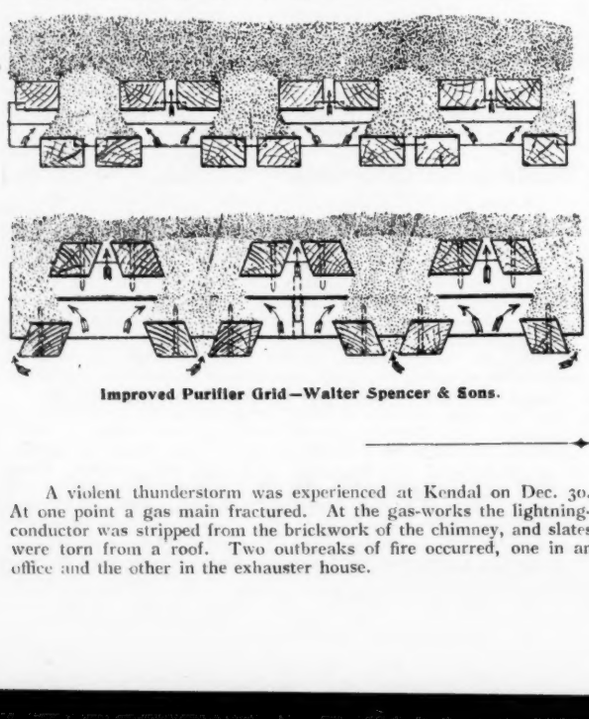
In order to operate the tap, one has only to hold the finger piece of the stem with the forefinger and thumb, and cause the thumb nail to raise or push aside the catch. Thus, although no springs are employed in the catch, the whole can easily be operated with the use only of a finger and thumb. A stop in the form of a projection is provided upon the casing, so that the catch cannot swing over out of action.

Grids for Purifiers.—No. 243,867.

SPENCER, S. E., of Elland.

No. 25,098; Oct. 22, 1924. No. 15,156; June 11, 1925.

This invention relates to flat horizontal grids of the type wherein two rows of support bars are arranged upon opposite sides of a bearer bar with the bars in one row adapted to break joint with the bars in the other row, or in which angularly placed laths arranged in pairs (with a suitable space between each pair) fit corresponding slots formed upon one side of a bearer bar. It has for its object the improved construction of such grids, whereby the shape and the relative arrangement of the support bars in pairs provide a grid adapted to set up comparatively larger pockets of purifying material alternately with corresponding inverted cavities between the two rows of bars, while the cavities and the space between each pair of support bars offer increased facilities for the distribution and filtration of the stream of gas passing from one layer of purifying material to another.



Improved Purifier Grid—Walter Spencer & Sons.

We reproduce two drawings illustrative of forms of construction of the grids and their effect on the gas stream. Other details are covered by the specification, notable among which is the use of headless screw-nails of abnormal pitch for joining-up the parts of the grids, and the protection of the nails with bituminous material.

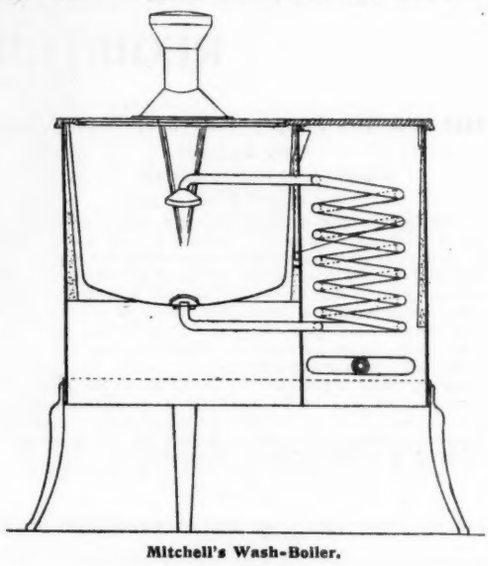
Domestic Wash-Boilers.—No. 243,875.

MITCHELL, G. P., of Blackburn.

No. 25,850; Oct. 30, 1924.

This invention relates to domestic and other gas boilers, and the like, for washing or other purposes, and of that type wherein the heating of the water is attained without direct application of the flame.

According to the invention, a coil in circulatory communication with the boiler is situated within a casing separate from the boiler, and separate from an outer shell for the boiler; communication between the separate casing and the space between the boiler and the outer shell being provided for the passage of hot air or gases from the one to the other. The heating means for the coil or water container are situated within or adjacent to the separate casing referred to.



Mitchell's Wash-Boiler.

We reproduce a sectional elevation of one form of the invention, in which a ring burner is employed for heating the coil.

Cookers.—No. 243,885.

MAIN, R. & A., LTD., and AIRD, K., both of Falkirk.

No. 26,514; Nov. 6, 1924.

The object of this invention is to construct a gas cooker in such a manner that the enamelled back and side linings of the oven, which retain the packing, are attached without the aid of screws and without the aid of separate fitting-frame or strips at the top and/or the bottom of the oven; and, further, that the sides comprising the outside casting, packing, and enamelled liner can be assembled as one unit without the use of screws or separate fasteners and stocked complete, thus facilitating the assembling of a cooker.

The single claim attached to the specification shows how this is carried out, as follows: In gas cookers, sides each constructed with nibs, snugs, ledges, or the like, on the inside top and bottom surface, a lining plate engaging the snugs or the like, and packing between the lining plate and side all as one unit side; a back provided with snugs or the like on the inside bottom surface, a lining plate having its side edges bent and packing between the lining plate and the back; a top and a front framing carrying the door, the sides, back, front framing, and top, being secured together to retain the lining plates and packing in position.

The patentees point out that they are aware that it has been proposed to employ side and back lining plates with ovens, the side plates being held between snugs or clamps on the oven at top and bottom, while the back plate is rested upon snugs or clamps at the bottom of the oven; the side plates being positionable next to vertical beads on the back plate to hold it in position. But with such construction the side plates are free at the front edges so as to be readily pulled out from the oven, and the back then removed for cleaning purposes; whereas by the present invention the side plates and back are secured permanently to the oven. Thereby, they say, heat-resisting packing can be employed, increasing the efficiency of the oven, and such side packing and linings can be made as one unit.

A violent thunderstorm was experienced at Kendal on Dec. 30. At one point a gas main fractured. At the gas-works the lightning-conductor was stripped from the brickwork of the chimney, and slates were torn from a roof. Two outbreaks of fire occurred, one in an office and the other in the exhauster house.

An inquest on a domestic servant named Elizabeth Everett, who was found dead from gas poisoning on Boxing Day, was held on Dec. 29. Dr. Gorski said he thought that Everett had an epileptic fit when in the act of lighting the gas. The Coroner recorded a verdict of "Accidental death."

MISCELLANEOUS NEWS.

BIRMINGHAM COKE SALES.

At a Meeting of the Council of the Birmingham Chamber of Commerce (Incorporated), on Monday, consideration was given to a report of the General Purposes Committee. They stated that, in accordance with the desire of the Council, Mr. F. Hickinbotham and Mr. John H. Allen, accompanied by the Secretary, had an interview with Alderman J. H. Lloyd, J.P. (Chairman of the Corporation Gas Committee), and Mr. A. W. Smith (General Manager and Secretary to the Gas Department), with regard to (1) the arrangements of the Gas Department in respect of the supply of coke to merchants who voluntarily undertake not to purchase gas coke from outside authorities or companies; and (2) the complaint that coke is sold at the Birmingham Gas-Works for delivery in London at a price lower than is charged to the Birmingham merchant or consumer.

In regard to the first point, the deputation suggested that the policy of the Gas Department deprived the Birmingham merchant and consumer of a free market in gas coke. In reply, it was pointed out that, while *primâ facie* this was the effect of the policy of the Department, that policy nevertheless was of great advantage to the Birmingham user, if only for the reason that it enabled the Gas Committee of the Corporation to keep their prices more or less stable. It was further pointed out that the conditions as to gas coke are somewhat different from those which apply to ordinary commercial business, and that, if a completely free market existed, fluctuations in prices would of necessity be much greater than they are to-day, as during the summer months the Corporation stocks of gas coke grow very considerably, while during the winter there is a comparative shortage.

Having regard to its nature and to the consequent amount of space which would be taken up if stocks were accumulated to any considerable extent, it was essential that the Corporation should endeavour, as far as possible, to dispose of their gas coke in a fairly regular way during the period of smallest demand. If a free market were created with all its possibilities of fluctuation in prices, then the margin between the price of coke in summer and coke in winter would be greatly extended, and the interests of the regular consumer seriously upset. The arrangements made by the Gas Committee were to the effect that the merchant who confined his purchases to Birmingham coke during the period of smallest demand, should be entitled to such supplies as might be available during the period of the greatest demand.

Figures were quoted on behalf of the Gas Department which proved that the price of the Birmingham gas coke under the existing policy compared most favourably with the prices charged by gas making authorities in other parts of the country; and it was stated, furthermore, that if a free market existed, and the Corporation had consequently had to reduce their prices during the summer months, then there would be justification to-day, when a shortage of supply is in prospect, for increasing the price to such figure as the coke would fetch. It was added that, were this done, then the sufferer would be the coke consumer. In so far as the question of price charged at works for delivery in London or elsewhere was concerned, the Gas Committee pointed out that the price in such cases was fixed in relation to the ultimate cost to the consumer, after payment of transport and handling charges. It was further stated that it would rarely, if ever, happen that the London consumer paid less than the Birmingham consumer. It was also added that in time of shortage coke is only supplied to firms outside the Birmingham district on existing contracts. In conclusion, the deputation were assured that, on the average, less than 5 p.ct. of the Birmingham gas coke is sold outside the Birmingham district, so that the amount concerned is inappreciable.

Having considered the facts put before the deputation, the Committee were of opinion that the arrangements made by the Gas Committee in relation to the sale of gas coke were, on the whole, advantageous to consumers in Birmingham and district, who needed a regular supply at a reasonable price without any undue fluctuations in the period of the greatest as compared with that of the smallest demand.

The report was approved.

GAS—THE UNIVERSAL FLAME.

These words appear as part of an arresting coloured page advertisement of the Sheffield Gas Company, on the front of the 1925 Industrial Supplement to the "Sheffield Daily Telegraph." The supplement itself contains an article describing what gas can do, and emphasizing the enterprising policy of the Company in supplying the domestic and industrial needs of the citizens in the form of light, heat, and power. Since 1923 the Company have installed 15,000 prepayment installations, with lighting fittings and cookers or rings. Cookers are now to be had on simple hire terms, fixed free up to 40 ft. of piping; or on hire-purchase, fixed free.

With regard to trade supplies, it may be said that, comparing the industrial load of the Company to-day with that of some sixteen years ago, when they opened their first experimental room, the progress made has been nothing short of phenomenal. At that time, with the exception of those used in the laboratory, very few gas furnaces were employed. To-day town gas as a fuel is indispensable to Sheffield industry. Over 3000 gas furnaces are in constant use throughout the year. By their aid exact temperatures are not only possible, but are being maintained regularly day in and day out all the year round by ordinary workmen, with the same ease and certainty of results as in the year 1909 were considered possible only by specialists in the laboratory. The year 1925 witnessed a still further increase in the demand for gas for industrial purposes. During the twelve months, despite the poor state of Sheffield trade generally, 60 new gas furnaces were supplied and fixed by the Gas Company. In addition, many furnaces which have been out of use since the trade slump set in have been repaired and adjusted by the Company's furnace department and put into regular employment. Many large solid fuel fired furnaces have also been converted during the year to burn gas. The increased demand for gas as a fuel for industrial purposes under the present adverse trade conditions is particularly gratifying to the Gas Company, because it is direct evidence, if any were needed, of the soundness of the Company's policy in supplying gas for this purpose at a reduced rate, and providing a special staff to deal with all propositions of an industrial nature. The Company's policy has always been to encourage the manufacturer to use gaseous rather than solid fuel. Their method is the very practical one of inviting those interested to inspect various types of furnaces in their furnace demonstration room, and to make actual trials in properly constructed apparatus, in order to test the merits of gas as an industrial fuel.

The "Sheffield Daily Independent," in their Trade Review, have also an article headed "Gas in World of Industry—Sheffield Fortunate in its Supply—Management that Gives Security." There is a portrait of Mr. Ralph Halkett (the Company's energetic General Manager); and the following figures bearing upon the Company's operations are quoted.

Gas sold in year (value), £591,190.
Ditto residual products, £215,981.
Consumers: 1925, 121,780; 1924, 112,118.
Coal carbonized in year, 228,380 tons.
Coke oven gas (taken from collieries), during year, cost £86,126.
Total cost of manufacturing gas, including all charges, £504,862.
Price from 7d. to 4d. per therm, according to quantity used, equal to 2s. 11d. to 1s. 8d. per 1000 c.ft.

CEARA GAS COMPANY, LTD.

The Annual General Meeting of the Company was held last Thursday, at the London Offices, No. 9, Queen Street Place, E.C.—Mr. F. W. BROTHERS (the Chairman) presiding.

The SECRETARY (Mr. E. Pratt) read the notice convening the meeting; and the report of the Directors for the year ended June 30 last was taken as read. This stated that the loss was £3799. The sum of £4000 had been transferred from reserve account; and there was left £525 to the credit of revenue. The currency remained at a low value during the year.

The CHAIRMAN, in moving the adoption of the report and accounts, said the costs under the various headings were much the same as on the last occasion. Repairs to street lanterns continued high, owing to the renewal of the copper tops destroyed by the action of acetic acid arising from the wood gas from towards the end of the war period until well into 1923. This item might be much the same in the current year. Certain lamp materials were subject to a high duty, not being "articles of utility." Repairs to mains and services were a little higher, and might continue so, inasmuch as in some cases the pipes dated back to the time of the inception of the works in 1868. Renewals would have to be undertaken from time to time of the older portions of the mains, and also some of the services, as and when street repairs and alterations admitted. The nature of the soil accounted, no doubt, for repairs of mains, &c., being small for so many years. The item of loss by exchange (over which the Company had no control) was £2000 more than for the year 1924. Gas rental remained about the same. A difficulty arose on the subject of an increase in the price of gas. That used for grills, rings, and ovens just met (together with residuals) wages and salaries in Ceará, which was a help; no part of this revenue being remitted. A discount of 20 p.ct. had been allowed on gas for this use for about thirty years. After due inquiry, the Company's Manager in Ceará found that, on these terms, gas was just level with the cost of wood as fuel for cooking stoves (the local method). An increase in the price would therefore be calculated to make gas too dear for the average user. The discount was being reduced to certain consumers, as and where possible; but it remained to be seen whether this move was detrimental to the consumption of gas. Regarding the outlook in Ceará, the position of cotton (the principal product) might affect the commercial position very considerably. Cultivation in the States of Rio de Janeiro and San Paulo having reduced the outlook for that grown in the State of Ceará, a decline in value had followed. The price at Nov. 30 was about 8½d. per lb., against 3s. in 1921. A consequent decline in the revenue of the State appeared inevitable. The current year might therefore be a "lean" one. Brazil generally had been said to be a "land of surprises;" but as far as the State of Ceará was concerned, there was no indication at present of any feature that might give hope for material improvement. At this the matter must be left.

The motion for the adoption of the report and accounts was seconded by Mr. CHARLES WEBB, and unanimously adopted.

On the proposition of Mr. WEBB, seconded by Mr. F. W. CHURCH, Mr. Brothers was re-elected a Director; tribute being paid to the time and attention he had so long devoted to the Company's affairs. The Auditor (Mr. W. J. Wright) was similarly re-appointed, on the motion of Mr. LONG, seconded by Mr. CHURCH.

Acknowledgment was made of the services rendered by the Chairman and his co-Director (Mr. Charles Webb), the Engineer in Ceará (Mr. W. A. Valon Watson), the Secretary, and the staff.

Record Output at Manchester.—During 1925 there has been a steady increase in the general business of the gas undertaking of the Manchester Corporation. The consumption of gas has increased by over 6 p.ct.

GAS REGULATION ACT APPLICATIONS.

There has appeared in the "London Gazette" the following notice regarding an application to the Board of Trade under the Act.

SPECIAL ORDER.

Ellesmere Urban District Council.

To extend the limits for the supply of gas, to authorize the Council to use scheduled land for gas-works purposes, to fix charges for gas supplied by prepayment meter, to borrow further money, and for other purposes.

IN HARNESS AT 95.

Presentation to Old Employees.

In the lives of two men—Mr. Joseph Walter Sutton and Mr. Charles William Escott, J.P.—the last day of 1925 will be associated with one of the most memorable and honourable events in their careers. They met at the London headquarters of Messrs. George Kent, Ltd., domestic machinery and meter manufacturers, 199, High Holborn, W.C., and were the principals in a series of presentations. The ceremony was to mark the retirement of Mr. Sutton in his 96th year and his 60th year with the firm; and the Company took advantage of the opportunity to present to Alderman Escott a token of their appreciation of his 63 years' service with the firm in London and Luton. Those present at the ceremony included Mr. Walter G. Kent, C.B.E. (Managing Director and Chairman), Lt.-Col. H. H. Kent, Mr. Guy W. Ardley (Assistant Managing Director), Commander P. W. Kent, R.N., Mr. D. T. Anstruther (Directors), and Mr. W. Leighton Tebby (Secretary).

In presenting Mr. Sutton with a silver fruit dish, Mr. Walter Kent said he was retiring from the position of Manager of the Domestic Machinery Department after 60 years' able work, which was characterized by loyalty, devotion, enterprise, and indomitable perseverance in the face of any difficulty. The dish was inscribed: "Presented to Joseph Walter Sutton in his 96th year, by the Directors of George Kent, Ltd., in grateful appreciation of the unique services rendered by him to the firm during an unbroken period of 60 years. Dec. 31, 1925."

To Alderman Escott a silver cigarette box was presented; and this was inscribed: "Presented to Alderman Charles W. Escott, J.P., by the Directors of George Kent, Ltd., in grateful appreciation of his services to the firm during a period of 63 years." Alderman Escott is still in charge of the Welfare and Employment Bureau at the Luton works.

On behalf of the staff, Alderman Escott then presented Mr. Sutton with a framed illuminated address; and in his eulogy of the firm's "grand old man," described him as a man of strong moral courage, indomitable pluck, and abundant energy.

Mr. Sutton made a feeling response, and left at the close of the ceremony with the heartiest good wishes of all.

Progress at Hinckley.

The continued increase in the consumption of gas in Hinckley and district will necessitate considerable extensions in the near future at the gas-works. At a meeting of the Urban Council, who own the works, it was stated that far more people were using gas than was the case before electricity was introduced.

Provincial Incandescent Fittings Co., Ltd.

This firm—best known as "Pifco"—was founded by Mr. Joseph Webber on Dec. 13, 1900. The first premises consisted of a small one-roomed shop in Corporation Street, Manchester. In the course of 25 years Mr. Webber, as Managing Director, has steered the business, through many vicissitudes and much opposition, into a premier position in the incandescent lighting industry. It may be mentioned that "Pifco" was the first firm in the United Kingdom to sell to the public a mantle at 2½d., and to introduce unbreakable gas globes—known as "P-A-L." Work and opposition have stimulated them to success. The opposition culminated in a lawsuit for libel brought by the Company in 1908, which lasted for five days in the Manchester Assizes before the late Mr. Justice Bray. Judgment was entered for the Company. This lawsuit prompted Mr. Webber to take a keen interest in the law, and resulted in his sending his eldest son, Mr. George Webber (who is now a Director) to the Bar. Mr. George Webber was called to the Bar at the Middle Temple in January, 1922, after having been placed first in the Bar Final Examination, and awarded a Studentship of 300 guineas by the Inns of Court. In September, 1922, he graduated as an LL.B. at London University, first with First Class Honours. In 1904, the Company moved to larger premises in Thomas Street, and then, in 1914, took the building known as "Pifco" House—a five-storey block, in High Street. The premises are equipped with a large staff and the latest scientific office equipment costing no less than £2000. In addition, "Pifco" permanently occupies a three-storey overflow warehouse at No. 1, Watling Street, Shudehill, to deal with goods as they are landed from America and the Continent from the factories with which the Company is associated. From one shop, the wholesale market of "Pifco" has grown so large that the Company has its agents, and numbers its customers by the thousands, in such diverse countries as America, Africa, and China—indeed, in every country in the world.

Owing to the frequency with which consumers are exchanging from slot to ordinary meters, and *vice versa*, it has been decided by the Darwen Gas Committee that a charge of 5s. be made for each alteration.

DIARIES AND CALENDARS.

With the close of the old year and the beginning of the new, several diaries, calendars, &c., have reached us. From the Staveley Coal and Iron Company, Ltd., of Chesterfield, we have a leather bound diary, included with which is a section which supplies a vast amount of useful information regarding chemical and coal tar products, and data as to pipes, bends, pressures, &c. The Torbay Paint Company's diary is the embodiment of compactness and refinement; and we always welcome it. A neatly bound, light, and serviceable diary has also reached us from the Stanton Iron-Works Company, Ltd. In addition to the diary, it contains a mass of valuable information. Messrs. Brotherton & Co., Ltd., have sent us a block of re-fills for the desk stand received from them on a previous occasion. Messrs. Newton, Chambers, & Co., Ltd., of the Thorncliffe Iron-Works, near Sheffield, have issued a wall calendar with date block printed in figures which can be seen afar off. The Gas Light and Coke Company's "Co-partnership Magazine" calendar gives in a nutshell many interesting details regarding the Company. From Messrs. W. Parkinson & Co. we welcome an excellent blotting pad for the desk, with a revolving date indicator in a flap at the top; lifting the flap we find a calendar for the year, other information, and an inch rule. Clearly printed wall calendars have also come to hand from Messrs. Davison & Partner, and the "Chemical Trade Review," and from Messrs. Peckett & Sons, Ltd., of Bristol.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

With New Year holidays, the past week was again one of little business. There were a few prompt inquiries, and other indications that a good demand may be expected on the resumption of normal conditions this week. Certainly business will be resumed in a tone of optimism, with collieries mostly in a good position for early dates.

The general outlook for the year is marred principally by the uncertainty as to what conditions will be at the end of the subvention period, and the consequent difficulty of contracting ahead. The slightly more optimistic vein in which the labour position is now being discussed gives rise to a hope that reasonableness on all sides may yet help to extricate the trade from its present plight.

Nominal quotations, in which there is little change, are 17s. 3d. to 17s. 6d. f.o.b. for Wear Specials, 16s. 6d. for best qualities, and 15s. to 15s. 6d. for seconds. Durham unscreened coking is firm at 15s. to 15s. 6d., and bunkers are 16s. to 17s. for best qualities.

Coke is still in strong demand, at 24s. to 25s. f.o.b. for gas makes.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

House coal is moving forward freely, with slightly increased prices. There is a strong impression that industrial coal will command better prices during the early part of this year, probably owing to the fact that limited stocks will be created, although the trade awaits with interest, before moving to any great extent, the result of the Coal Commission inquiry.

Gas coals in the open market are inclined to appreciate.

The export market appears to be chiefly ruled by the sellers on this side; the figures to be paid by the consumers abroad being somewhat lower in volume.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

Coal-getting was resumed at some of the pits in the middle of the week following Christmas. The interruption of output was severely felt in the house coal trade; stocks being reduced to bareness in many directions. Efforts to replenish supplies in the populous centres were obstructed by the shortage of railway wagons and engine power. Traffic disorganization was relieved during the holiday season; but as soon as the new business began to circulate, transport limitations quickly re-asserted themselves. Post-war reductions of working hours on the railways imply a proportionate increase of rolling stock, if the transport service is not to deteriorate.

Traders note with satisfaction the steps which some of the railway organizations are taking to augment their resources in locomotives and wagons. It is surprising that so little stringency, comparatively speaking, has characterized the market. Contract deliveries to gas-works have been maintained, and the needs of industry have been met. A slow and irregular resumption, particularly in the heavy industries, has moderated the strain. While notifications have been issued of advances in particular classes of house coals, values generally have not changed.

For blast-furnace coke 1s. to 1s. 6d. more is being paid in the absence of any agreement for price stabilization. Some of the pig-iron smelters are marking time till they see what comes of further negotiations. There is no movement in this district answering to the sudden tension in Cleveland pig iron.

The Darwen Gas Committee have decided to reconstruct one bed of three chambers of the Munich carbonizing plant, at an estimated cost of £2400. Application is to be made for the requisite borrowing powers.

CURRENT SALES OF GAS PRODUCTS

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 4.

There is a moderate amount of inquiry for tar products, and prices generally are firm. It is reported that 57s. 6d. per ton f.o.b. has been paid for pitch, and even something slightly above this figure.

A considerable amount of business is being booked in tar for delivery over the coming season; and it would appear that most surveyors are budgetting for extended programmes this year.

Creosote is steady at 7¼d. per gallon, in bulk, at makers' works.

There is a little more inquiry for naphthalene, but the prices obtainable are still on the low side.

All tar spirits are in request. Pure benzole and pure toluole are firm at 2s. 2d. per gallon, 95/160 solvent naphtha at 1s. 10d. per gallon, and 90/140 pyridine bases at 19s. 6d. to 20s.

Tar Products in the Provinces.

Jan. 4.

There is little or no alteration in markets for tar products, which, generally speaking, remain firm.

Pitch is still firm. Makers on this side report small sales at prices varying between 55s. and 57s. 6d., according to port; while there are indications that Continental manufacturers are still in want of further quantities, and will have to pay round about these figures.

Creosote is still firm with a good demand for both home and export. Water-white products are firm. There is a keen demand for benzole for delivery over the first six months of this year. Solvent naphtha is steady, and contracts are reported for delivery over the first six months of this year at good prices.

Heavy naphtha is neglected, owing to the very keen competition of petroleum white spirit. There continues to be a good deal of inquiry for special grades of cresylic acid.

The average values for gas-works products during the week were: Gas-works coal tar, 39s. to 44s. Pitch, East Coast, 56s. to 58s. f.o.b. West Coast—Manchester, 50s. to 52s. 6d.; Liverpool, 51s. to 53s.; Clyde, 54s. to 55s. Benzole, 90 p.ct. North, 1s. 8½d. to 1s. 9½d.; crude, 65 p.ct., at 120° C., 1s. 1d. to 1s. 2d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 8½d. to 1s. 9½d. Toluole, naked, North, 1s. 8d. to 1s. 9d., nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 7½d. to 1s. 8½d. Heavy naphtha, North, 11½d. to 1s. 0½d. Creosote, in bulk, North, liquid, 6½d. to 6¾d.; salty, 6d. to 6¼d.; Scotland, 5¾d. to 6d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Holophane, Ltd.—This firm has been registered as a public Company, with a capital of £100,000 in £1 shares, to acquire the business of Holophane, Ltd. (incorporated in 1910), to adopt an agreement with the Liquidator, to acquire any invention relating to illuminating appliances, &c.

Progress at Accrington.—After his re-election as Chairman of the Accrington and District Gas Board, Mr. D. C. Dewhurst, J.P., said the year had been one of progress. Gas sales had increased in six years to what they had expected to reach in twelve years. This would mean extensions to their plant next year, and considerable extensions and enlargements of their distributing mains. Application is to be made for sanction to borrow £3015 for the supply and erection of cast-iron water-cooled condensers.

Fatal Acetylene Explosion.—An explosion of an acetylene gas container, resulting in the death of James Dibble, a labourer, took place at Little Aston Hall, near Birmingham. At the time he was dismantling the plant, which had been disconnected from the service pipes for some time. He drove a hole with a pike in the cover of the manhole on top of the container, and, failing to detect any smell of gas, gave orders for the lid to be removed, in order that the interior might be ventilated. Five minutes later the explosion occurred.

Gas Cooking Triumphs.—There has lately been controversy in the Committee of the Bradford Board of Guardians responsible for domestic administration at the Institutions at Bowling and Odsal, as to whether the present gas cooking system should be replaced by electricity. A Sub-Committee visited electric cooking installations at Institutions in Sheffield and Salford, and came back with a recommendation in favour of electric cooking. The Bradford Corporation Gas Department, having thus had their attention drawn to what was apparently defective service by the gas appliances, took these out and re-fitted them, with the result that they now give very much more efficient service, and the Committee have decided to retain gas for cooking.

Relief of Rates at Oswaldtwistle.—This debatable question was raised at a recent meeting of the Oswaldtwistle Council, when Mr. Scholes (Chairman of the Gas Committee) protested against £1000 being transferred from the gas profits for the relief of rates. He contended that it was unjust to relieve, at the expense of those who used gas, the rates of householders and tradesmen who used electricity. Mr. Scholes reported that 114,533,000 c.ft. of gas had been manufactured during the year—an increase of nearly 4½ millions. The net profit was £2994, against £5650 a year ago. A new retort house and carbonizing plant had recently been erected. Gas was first made in the new plant on Nov. 9. The contractors (Messrs. Drakes, Ltd.) merited their best thanks for the efficient manner in which the work had been carried out. The total cookers, fires, and boilers fixed during the last eight months was 360, against 207 last year.

New Joint-Stock Companies.—Among new companies registered are Messrs. Breeden & Co., of Fazeley Street, Birmingham, with a capital of £1000, to carry on business as manufacturers of gas and other fittings, lamps, and stoves; and Kitson Lights, Pumps, and Refrigerators, with a capital of £14,000, to acquire the business lately carried on by the Kitson Engineering Company (London), Ltd., and Mr. G. L. Ponsford.

Price of Gas at Hartlepool.—The Hartlepool Town Council discussed again at their last meeting the question of the price of gas; and a deputation were appointed to wait on the Gas and Water Company. Mr. Parkinson, who moved this, said he thought an excellent case could be made out for a reduction. Mr. Davison described it as a waste of time arguing the point with the Company, and advocated the setting-up of a Corporation electrical undertaking.

Housing Developments at Birmingham.—The Birmingham Gas Committee, in a report to the January meeting of the City Council, make recommendations favouring expenditure on new mains and meters. They point out that their expenditure on new mains, services, and meters since the commencement of the present financial year has been very heavy, consequent on the increased activity of the building trades and the rapid development of schemes by the several local housing authorities within the area of gas supply. The outlay for the purposes mentioned will probably continue until the present house shortage is overtaken; and it is necessary that a loan should be obtained to meet the estimated capital expenditure up to March, 1927. It is estimated that a sum of £186,000 will be required for new mains and services, and £86,000 for meters, during the period mentioned; but provision should be made to meet any slight increase that may be required in case development should take place at a rather more rapid rate than is anticipated. The Committee therefore recommend that application be made to the Government for sanction to borrow £275,000. The Committee add that it will be necessary to borrow in the near future for other capital purposes.

Subsidences in Chorley have resulted in many breakages of the gas mains; and the Gas Engineer has presented a report on the matter to his Committee. He has been authorized to engage extra labour to uncover the full length of the pipes where the subsidences have occurred, and to strengthen them wherever necessary.

We learn that Messrs. Parkinson and W. & B. Cowan, Ltd., in paying (on Dec. 31) an interim dividend on ordinary shares at the rate of 5 p.ct. per annum for the half-year to Sept. 30 last, have notified their shareholders that, although the keen price competition in the gas meter industry—referred to in their last annual report—continues, increased revenue from other sources enables the Directors to pay the usual rate of interim dividend.

On Dec. 29, an inquest was held on George Wadman, who was found dead at Leighton's Buildings, Millbank, on Christmas Eve. He had been using the scullery; and it was stated in evidence that the gas from a ring burner had been escaping, because another penny was required for the meter. The gas would go out, if the tap was turned-on slightly, shortly before the pennyworth of gas had been exhausted. A verdict of "Accidental death" was recorded.

On Friday morning, while four members of the Exeter Fire Brigade were on duty at a coke dump at the gas-works, where fire had broken out, two men were overcome by the fumes. Fireman Chas. Seage died from the effects; and Fireman Penberthy had to be removed to hospital. The fire had been smouldering some days, despite efforts to subdue it; and it was while the brigade were endeavouring to prevent it from spreading that the tragic occurrence took place.

On Wednesday, Dec. 30, the sixth annual conference of Jackson Boilers, Ltd., of Leeds, was held in the Griffin Hotel. Mr. J. H. N. Peel (Director), who presided, emphasized the phenomenal growth of the firm. The sale of gas-heated boilers, heaters, and café fountains in 1925 had broken all records; the increase in sales over 1924 being equal to the total output for 1915. Everywhere the name of Jackson Boilers, Ltd., was respected for straight dealing and efficient service; and there was an ever-increasing demand for the products of the firm. Mr. A. G. Barrow (General Manager) paid a glowing tribute to the successful work of the sales staff. He described the high degree of efficiency to which the organization of the Company had been brought, and said that he was happy in being able to state that the works and sales department operated as one unit. The various branch managers and salesmen expressed their appreciation of the perfect understanding which exists throughout the entire organization, and stated that they were confident that the sales for 1926 would exceed even those of 1925.

A gas tragedy occurred at Plymouth during Christmastide. On Christmas Eve a fitter in the employment of the Plymouth Gas Company blew-out the service pipe at a house in Durham Avenue, at the request of the tenant, and reconnected the pipe safely. A faint smell of gas was subsequently noticed, but it was attributed to the blowing operations; and the occupants retired for the night. Early the following morning one of them awoke with a feeling of suffocation, and found that several others were also similarly affected. The sixteen year old son of the tenant was found in a stupor in a gas-filled room; and though artificial respiration was performed upon him for two hours, he never recovered consciousness. At the inquest, Mr. Percy S. Hoyte, Chief Engineer of the Plymouth Gas Company, said that the service pipe at the house in Durham Avenue had been examined by him, and part was corroded. The rest of the pipe was in excellent condition. The Coroner, in returning a verdict of "Death by misadventure through gas poisoning," said the fatality was the result of a pure accident; and no fault could be attached to anybody.

STOCK MARKET REPORT.

THE past year has been a depressing one for holders of Gas Stocks. When we reviewed the position a year ago, it was the general opinion that values, which had been steadily improving, would be maintained during the year 1925. The actual results, however, have not justified this confidence. Ignoring for the moment the Foreign and Colonial undertakings, there are only three companies in the stocks of which any appreciation of importance has occurred. Brighton "A," which was standing at an absurdly low figure a year ago, is now 13 points higher at 137—142; while the Alliance and Dublin ordinary and the Chester ordinary also show improvements of 3½ and 4 points respectively. With these exceptions, there is a series of heavy falls in the values of the various stocks. The Tynemouth Consolidated heads the list with a fall of 15 points, to 69—77, and Newcastle-on-Tyne follows close with a drop of 14¼ to 69—71. The Brentford two stocks are 13 points down at 98—103; the Commercial two stocks are 12 points lower at 81—86; and the decreases in the Wandsworth Company's stocks vary from 13 points on the "Wimbledon" to 9 points on the "Epsom" stock. The Gas Light and Coke Company ordinary and the British ordinary also show double figure depreciations, and there are many others in close proximity.

These reductions in values, though partly attributable to the general depression, are the more remarkable having regard to the fact that, with the exception of a few companies, including Commercial, Tottenham, and Wandsworth, the last dividends paid show no reduction on those distributed during the last half of the previous year, and that, in a few instances, dividends were actually increased.

Following the precedent set up a year ago, we again show in the last column of the Table the lowest and highest quotations during the year. The Imperial Continental capital stock again has the most extreme variations; there being a margin of no less than 52 points in the price at which business could be done. Of the English Companies it will be seen that the values of the Brentford Company's stocks have varied by 25 points, and the Brighton "A" follows with 23 points margin. Derby Consolidated is again one of the steadiest stocks, having varied by 5 points only during the year, as was also the case with the Hornsey 7 p.ct. stock.

The following transactions were recorded during the week:

On Monday, Commercial 3½ p.ct. 81¼, 3 p.ct. debenture 56½ *ex* div., European 6, 6¼, Gas Light and Coke 84½, 85, 85¼, Imperial Continental 136, Lea Bridge 98½, 99¾, South Metropolitan 94, South Suburban 5 p.ct. 100, 101, 5 p.ct. debenture 94 *ex* div.

On Tuesday, Croydon maximum dividend 83⅜, Gas Light and Coke 84⅞, 85, 85⅛, 85¼, 3½ p.ct. maximum 60¼, Primitiva 11s. 6d., 11s. 7⅛d., South Metropolitan 94, Tottenham "B" 89¼. Supplementary prices, Bath Gas Light and Coke 93, Colombo Gas and Water (£1) 26s., 26s. 3d.

On Wednesday, British 105¼, Colombo 26s., 26s. 3d., European 6⅜, Gas Light and Coke 85, 85½, Hongkong and China 20¾, Imperial Continental 135⅝, 136, Primitiva 11s. 9d., South Metropolitan 94, 94½, South Suburban 5 p.ct. 100, 101, 5 p.ct. debenture 94 *ex* div., Tottenham "B" 89, 90.

On Thursday, Continental Union 35, Gas Light and Coke 84⅜, 85⅜, 85½, Montevideo 70, Primitiva 11s. 10½d., South Metropolitan 94, 94¼, 94½, Tottenham "B" 90¼.

Business on the Stock Exchange was exceedingly quiet during the whole of the week, but a general optimism prevailed with regard to the future. There are many new issues pending, mostly in the Miscellaneous Market; while there will probably be some Colonial and Home Corporation issues. The Rubber Market is still active, but more caution is being displayed.

Money was in abundant supply on Friday, as is usual on the first day of the year; and at the close of business, loans were obtainable for the night at as low as 2½ p.ct. Treasury Bills were allotted at about 2s. 6d. p.ct. cheaper, or £4 15s. 6·85d. p.ct.

Foreign Exchanges were inactive. Sterling on New York was steady at 4.85 5/16, the French franc closed at 120¼, Belgian francs at 106.97½, and Italian lire were a little dearer at 119.95.

Silver was featureless at 31 11/16d. per oz., and Gold remained nominally at 84s. 11d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Dec. 31.	Rise or Fall.	Lowest and Highest Quotations during the Year 1925.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 13	5	5	Aldershot 5 p.c. max. C.	75—78	..	75—88
322,992	,,	,,	4	4	Do. 4 p.c. Pref.	70—75	..	69—77
1,551,868	,,	Oct. 8	6¼	6¼	Alliance & Dublin Ord.	68—72	..	62—72
374,000	,,	July 9	4	4	Do. 4 p.c. Deb.	60—65	..	60—68
300,000	1	Oct. 22	1/7½	1/7½	Bombay, Ltd.	7/8—1	..	7/8—1 1/16
170,000	10	Aug. 13	8½	8½	Bournemouth 5 p.c.	12—13	..	12—13⅜
425,050	10	,,	7	7	Do. B 7 p.c.	12—12½	..	12—13
150,000	10	,,	6	6	Do. Pref. 6 p.c.	11—12	..	10⅜—12
50,000	Stk.	June 25	3	3	Do. 3 p.c. Deb.	56—59	..	55—60
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	77—80	..	76—81
992,045	,,	July 9	6 1/16	6 1/16	Brentford A Con.	98—103	..	92—117
990,500	,,	,,	6¼	6¼	Do. B New	98—103	..	91—117
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	95—98	..	89—98
306,690	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	75—80*	..	75—81
181,337	,,	,,	6	6	Do. 6 p.c. Rich. Red. Deb.	100—105*	..	100—105
214,740	,,	Aug. 27	12½	12	Brighton & Hove Orig.	170—175	..	161—175
244,200	,,	,,	9½	9	Do. A Ord.	137—142	..	119—142
1,287,500	,,	July 23	5	5	Bristol 5 p.c. max.	89—91*a*	..	89—97½
855,000	,,	Oct. 8	7	8	British Ord.	105—110	..	102—120
100,000	,,	June 25	7	7	Do. 7 p.c. Pref.	120—125	..	120—128
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	71—76	..	70—77
100,000	10	Dec. 17	8	6	Cape Town, Ltd.	6½—7⅛*	..	6⅛—8
100,000	10	Nov. 5	4½	4½	Do. 4½ p.c. Pref.	6½—6⅝	..	5⅞—7⅛
150,000	Stk.	June 25	4½	4½	Do. 4½ p.c. Deb.	70—75	..	69—76
626,860	,,	July 23	6	6	Cardiff Con. Ord.	98—101	..	95—104
237,860	,,	June 25	7⅛	7⅛	Do. 7⅛ p.c. Red. Deb.	101—104	..	103—108
157,150	,,	Aug. 13	6½	5	Chester 5 p.c. Ord.	90—95*b*	..	86—96
1,513,280	,,	July 23	5/14.8	5⅛	Commercial 4 p.c. Cap.	81—86	..	78—97
560,000	,,	,,	5⅜	5/8/4	Do. 3½ p.c. Cap.	81—86	..	78—97
475,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb.	55—58*	..	55—60
800,000	,,	Oct. 8	—	4	Continental Union, Ltd.	35—40	..	30—45
200,000	,,	,,	7	7	Do. 7 p.c. Pref.	87—90	..	85—92
660,000	,,	Aug. 13	6½	6½	Croydon sliding scale	97—101	..	96—105
284,975	,,	,,	5	5	Do. max. div.	81—84	..	81—88
492,270	,,	Aug. 13	9	6	Derby Con.	107—109*c*	..*	107—112
55,000	,,	Dec. 17	4	4	Do. Deb.	74—76*c**	..	74—76
1,002,180	10	July 23	4	6	European, Ltd.	6—7	..	6—9½
16,460,070	Stk.	Aug. 13	5½	5½	Gas Light & Coke 4 p.c. Ord.	84—86	..	79—99
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	60—63	..	59—67
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80	..	76—82
4,761,930	,,	Dec. 17	3	3	Do. 3 p.c. Con. Deb.	58—61*	..	58—63
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 10	6¾	6¾	Hastings & St L. 5 p.c. Conv.	90—95	..	90—100
258,740	,,	,,	5¾	5¾	Do. 3½ p.c. Conv.	71—76	..	71—80
70,000	10	Sept. 24	10	10	Hongkong & China, Ltd.	19½—20½	..	15½—20½
86,600	Stk.	Aug. 13	10	10	Hornsey 7 p.c.	132—137	..	132—137
1,976,000	,,	Nov. 19	59	10	Imperial Continental Cap.	133—138	..	133—185
226,170	,,	Aug. 13	3½	3½	Do. 3½ p.c. Red. Deb.	70—73	..	69—74
235,242	,,	Aug. 13	6½	6½	Lea Bridge 5 p.c. Ord.	97—102	..	94—103
2,127,340	,,	Aug. 13	5½	5½	Liverpool 5 p.c. Ord.	82½—83½*b*	+½	82—94¾
600,000	,,	Sept. 24	7	7	Do. 7 p.c. Red. Pref.	101¼—103½*b*	..	101½—110
165,736	,,	Aug. 27	8	9	Maidstone 5 p.c. Cap.	118—128	..	118—135
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb.	54—59*	..	52—60
75,000	5	Dec. 3	7	6	Malta & Mediterranean	4½—5	..	3¾—5
541,920	Stk.	Nov. 19	4	4	Montevideo, Ltd.	68—72	..	60—72
2,061,315	,,	Aug. 13	5	5	Newcastle & Gateshead Con.	69⅝—70¼*d*	..	69—88½
300,929	,,	,,	4	4	Do. 4 p.c. Pref.	75½—76½*d*	..	72¼—78
529,705	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb.	66½—67½*d**	..	66—69½
15,000	,,	Aug. 27	12	11½	North Middlesex 10 p.c.	160—170	..	..
75,940	,,	,,	8⅝	8 5/16	Do. 7 p.c.	115—120	..	..
300,000	Stk.	Dec. 3	7	9	Oriental, Ltd.	98—103	..	98—107
188,120	,,	June 25	7⅞	7⅞	Plym'th & Ston'house 5 p.c.	112—117	..	108—117
60,000	50	Aug. 27	14	14	Portsea Island B	93—96	..	93—102
100,000	50	,,	13	13	Do. C	90—95	..	90—100
2,289,309	1	—	—	—	Primitiva Ord.	11/3—12/3	+·/3	7/9—13/6
302,600	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	82—84	..	76—86½
600,000	Stk.	July 23	4	4	Do. 4 p.c. Red. Deb. 1911	64—66	..	62—66
193,744	,,	Dec. 17	4	4	Do. B. Aires 4 p.c. Rd. Db.	64—66*	..	63—67
264,496	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	64—66*	..	63—67
150,000	10	Sept. 24	6	6	San Paulo 6 p.c. Pref.	7⅛—8	..	7¼—8¾
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	42—45	..	40—46
270,000	Stk.	Aug. 27	5⅜	5⅛	Sheffield A	99—101*e*	..	98—106
419,968	,,	,,	5⅜	5⅛	Do. B	99—100*e*	..	98—106
1,047,000	,,	,,	5⅜	5⅛	Do. C	99—100*e*	..	98—106
90,000	10	June 11	6	4	South African	5—7	..	5—9
6,609,895	Stk.	Aug. 13	6⅛	5	South Met. Ord.	93½—95½	..	90—104½
1,895,445	,,	July 9	3	3	Do. 3 p.c. Deb.	57—60	..	57—63
734,000	,,	Sept. 10	6½	6½	Do. 6½ p.c. Red. Db.	103—105	..	101—107
91,500	,,	Aug. 13	8⅛	8⅛	South Shields Con.	128—130*d*	−1	123—141
1,187,795	,,	July 23	6½	6½	South Suburban Ord. 5 p.c.	99—103	..	90—112
368,897	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	93—96*	..	93—100
647,740	,,	Oct. 22	5	5	South'mpton Ord. 5 p.c. max	78—81	..	78—86
121,275	,,	June 25	4	4	Do. 4 p.c. Deb.	70—75	..	70—77
250,000	,,	Aug. 27	7	7	Swansea 7 p.c. Red. Pref.	101—103	..	100—106
200,000	,,	Dec. 17	6⅛	6⅛	Do. 6⅛ p.c. Red. Deb.	100—102*	..	99—105
120,000	,,	July 23	8	7⅜	Tottenham District A 5 p.c.	110—115	..	105—122
882,275	,,	,,	6⅛	5⅞	Do. B 3½ p.c.	88—93	..	85—105
150,000	,,	July 9	—	28/4	Do. 5½ p.c. Pref.	103—105	..	103—105
181,255	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	74—77*	..	74—80
258,251	,,	Aug. 27	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, &	69—71*d*	..	69—87
197,294	,,	Aug. 27	6⅞	6⅞	Wycombe 5 p.c.	93—98	..	93—107
88,330	,,	,,	5	5	Do. 5 p.c. pref.	93—98	..	93—100
91,800	,,	,,	6⅞	6⅞	Do. 5 p.c. Maidenh'd	88—93	..	88—105
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 9	9½	8½	Wandsworth A 5 p.c.	128—133	..	123—145
255,636	,,	,,	7⅞	7	Do. B 3½ p.c.	109—114	..	107—125
392,955	,,	,,	6/9/6	5/19/0	Do. C and New	92—97	..	90—107
352,000	,,	,,	7⅞	6⅞	Wimbledon 5 p.c.	103—108	..	100—121
98,000	,,	,,	7⅞	7⅛	Epsom 5 p.c.	113—118	..	109—127
88,416	,,	June 25	3	3	3 p.c. Deb.	56—59	..	55—60

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